EDITORIAL

DOMESTIC ENGINEERING

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RADIO AND PLUMBING.

A YEAR ago the word radio had no significance to the vast majority of the people of this country, but today there are few who have not at least listened to messages sent by this method. It has become a decidedly practical thing and has remarkable possibilities in educational and promotional work. Already it has helped to stimulate the plumbing business at least indirectly through the broadcasting of information regarding health and sanitation. A recent bulletin, one of a series of twenty-five being broadcast from radio station WGY Schenectady, N. Y., through the co-operation of the General Electric Company, by Dr. Herman M. Biggs, New York State Commissioner of Health, points out the danger in connection with the use of the common drinking cup. According to the bulletin there are still a great many of these in use in public places, even in a large number of schools where it is particularly dangerous because of the fact that many of the diseases common to children such as measles, scarlet fever, diphtheria and so forth, are spread from mouth to mouth in the saliva that remains on the rim of the cup. Bulletins of this nature help to prepare the way for the plumber to sell modern sanitary drinking fountains. There are a great many schools, office buildings, industrial plants, motion picture theatres, etc., that are excellent prospects for the sale of these sanitary and artistic devices, particularly at this time of the year. It is business worth going after.

SETTLE IT NOW.

THE recent street car strike in Chicago, though it only lasted about a week, is said to have cost $1,200,000. The loss to American business occasioned by the coal and railroad strikes already is far more terrific, and the end is not yet in sight. But even should they be ended soon, what assurance is there that we will not have to go through much the same experience next year and the year after or whenever the parties involved again make up their minds to quarrel and quarrel in such a way as seriously to cripple American business?

The final settlement in these disputes is usually through a compromise, a yielding of both sides, and the terms are generally about what both sides would have accepted in the first place. And when it is all over the public usually pays just a little more for the goods or service or fails to obtain an expected reduction.

If gradually but continually mounting costs of providing transportation and coal compel gradually increasing prices to the public let us have them without these nerve-wracking, business-wrecking, periodical interruptions. We have recognized the right of labor to organize and to strike, and we cannot ignore their strength. We have recognized the right of employers to organize, to lockout their employes, and we cannot ignore their strength either, However, in the light of recent experience, the American public may find it necessary to revise its opinions, for transportation and coal are so vital to American business, in fact to the country's very life, that it can no longer risk the complete paralysis that follows the cessation of transportation and coal mining. If the cure is the establishment of a federal industrial court for compulsory arbitration of all disputes between coal miners and operators and railroad employes and employers, then let us go about it now. If changes in our laws or even our Constitution are necessary, let us make them. We have made changes in our Constitution for less important matters. If this is not the solution, let us find out what is, and put it into effect regardless of how drastic it may at first mean. We cannot go on forever at the mercy of a very small minority quarreling or pretending to quarrel over their rights or supposed rights in utter disregard of the other ninety-five per cent of the country.

ABOUT SEVERAL THINGS.

Marooning passengers in a desert with thermometers registering 100 degrees is a poor way to win public sympathy for a railroad strike.

* * *

This is the time to remind your customers and prospects to have their heating systems inspected and made ready for the fall and winter. The coal and railroad strikes are providing you with convincing arguments.

* * *

The Bath-a-Day idea should go over strong these days and the sale of showers should show a corresponding increase.

SYSTEM *and* HIGH STANDARDS *the* FOUNDATION *of* PROSPEROUS PLUMBING COMPANY'S SUCCESS

Securing Business on a Basis of Superior Quality and Establishing a System of Accounting That Reflects at All Times the Standing of the Business, Brings Thirty-seven Years of Success to a Milwaukee Contractor

W. H. Halsey.

THE doctrine of "System" in the conducting of a plumbing contracting business has been preached time and again, but it is always a new story to someone, and it is always an interesting story when we are fortunate enough to see at first hand a shop in which an accurate accounting system, and a careful check on all money and material investments has brought results that are well worth striving for.

A business of this kind is the one conducted by W. H. Halsey & Sons Co., Milwaukee, Wisconsin. Here everything is catalogued, cross-indexed and filed so that the heads of the business can tell at any time how the general business stands, and how much has been made or lost on every job under construction at the time.

How is this accomplished? Well, it is a long story, and it must come from the lips of an enthusiast for higher grade business and business standing like Jay Halsey, a member of the firm and son of the founder of the business, to be at its best, but a little time spent with that gentleman sends the visitor away with some very definite impressions of the factors that have made this firm an unqualified success in every single year of the 37 it has been in business.

To know just where your business stands at all times, to know if every dollar invested, every job under construction and every hour of labor employed is bringing the proper returns, — that is scientific management of a business, regardless of the size of the company. Here is a firm that has a most exacting system of caring for records and accounts, and finds that it pays. If you are interested in big business methods applied to the plumbing industry, you will be interested in the story of W. H. Halsey & Sons Co., Milwaukee.

The firm of Halsey is not a firm of plumbers in the old sense of the word, but a firm of sanitary engineers. The office is small but compact, and the shop in back is also rather small, considering the volume of work turned out here every year, but it is large enough for the needs of the firm, for in it is kept nothing but materials held in stock for repair work. All other material is bought in carload lots, and hauled right to the job—a system that has two distinct advantages—first the carload rate discount, and second—the elimination of the cost of hauling material from the shop to the job—an item well worth considering when economical operation is desired.

A shack is built on the grounds on all large jobs and this serves as a temporary enclosure for all tools and small fittings that could easily be stolen. Pipe up to 8 inches is cut and threaded on the job by means of portable power threading machines. When large pipe is used it is bought cut to specifications.

Explaining why he considers a large shop unnecessary, Mr. Jay Halsey says: "A pet idea of mine that I would like to work out sometime would be to get into a building with architects and engineers and mix with them. The architect needs to be told every once in awhile that plumbing is an art, a real science, and the more the architect and the general contractor get this fixed in their minds, the better it is for the plumbing contractors all around. If there is a plumber's office near that of the architect, he is going to consult with the plumber on his part of the work, with the result that when the final specifications are written up, a lot of the plumber's ideas are incorporated in them. Of course when it comes to the bidding this will be an advantage, to a certain extent, to the individual contractor who was consulted, but in the long run it will be an advantage to the trade as a whole."

Repair Work Handled by Specialists.

Any firm that has done a large amount of residence work for the past thirty-seven years will, naturally, have a large clientele sending in calls for repair work, and this class of trade the Halsey Company takes care of promptly. They have found that certain mechanics are better fitted for repair or job work than they are for any other kind, so these men are always assigned to this. There are several journeymen in the establishment who have done nothing but make residence repairs for the last ten years. These men become more valuable on this kind of work as time goes on, for they get to know many of the different houses and when called to one for some particular job they are able to proceed at once to the proper valves, locate the right lines and consequently get through with the minimum of confusion and wasted time. Other mechanics who are most skilled in roughing in do all of this work, while still others do all the finishing. Of course there are times when these lines must be overstepped for expediency sake, but in general they are held to rather closely; and so there we have our first point in the systematic shop—the division of labor.

But when a shop is engaging in two or three kinds of work at one time, the question naturally arises, Is this or that kind

of job paying, or are the profits from the other work just supporting it? That question is readily answered here, for individual records are kept, not only of all the different jobs, but of the aggregate amount of and the profit on jobs done under one system.

All repair jobs that are done without an estimate or a contract are classed as "Job Work" on the records. This may include anything from packing a faucet to laying a new sewer connection—anything, in fact, that is done without an estimate.

Another type of work, however, that comes up is the job on which no definite bid can be made until the plumbers have gotten into the work far enough to see how much time and material will be needed. This is done on an approximate bid, or cost plus basis. The "plus" varies anywhere from ten to thirty per cent, depending on the amount of work to be done.

The third class of work is the straight contract work. Does the cost plus work pay as much in proportion to the amount expended as the contract work? Is the jobbing the best paying of all, or does one of the three classes fail to pay

W. H. HALSEY & SONS COMPANY

Plumbing Contractors

HARRY SCHLESINGER, BROWN DEER, WIS.

Directions for Shutting Off Cold, Hot and Soft Water.

No. 1	Shuts off main valve for well water located near floor in basement toilet room.
No. 2	Shuts off main valve for soft water located near floor in basement toilet room.
No. 3	Shuts off basement closet located in basement toilet room.
No. 4	Shuts off well water for pantry sink located in basement toilet room.
No. 5	Shuts off soft water for pantry sink located in basement toilet room.
No. 6	Shuts off hot water for pantry sink located in basement toilet room.
No. 7 & 10	Shuts off hot water for 2nd floor slop sink and helps' bath room located in basement rear hall.
No. 8	Shuts off soft water helps' bath room located in basement rear hall.
No. 9	Shuts off well water helps' bath room located in basement rear hall.
No. 11	Shuts off hot water for laundry trays located in laundry.
No. 12	Shuts off soft water for laundry trays located in laundry.
No. 13	Shuts off well water for laundry trays located in laundry.
No. 14 & 15	Shuts off hot water 1st floor toilet room located in laundry.
No. 16	Shuts off soft water 1st floor toilet room located in laundry.
No. 17	Shuts off well water 1st floor toilet room located in laundry.
No. 18	Shuts off well water north sill cock located in laundry.
No. 19	Shuts off well water south-west sill cock located in furnace room.
No. 20	Shuts off soft water for kitchen sink located in furnace room.
No. 21	Shuts off well water for kitchen sink located in furnace room.
No. 22	Shuts off hot water for kitchen sink located in furnace room.
No. 23	Shuts off hot water 1st floor helps' bath room located in furnace room.
No. 24	Shuts off soft water 1st floor helps' bath room located in furnace room.
No. 25	Shuts off well water 1st floor helps' bath room located in furnace room.
No. 26	Shuts off well water for hot water tank located in furnace room.
No. 27	Shuts off soft water for hot water tank located in furnace room.
No. 28	Drain connection for hot water tank located in furnace room.
No. 29 & 30	Shuts off hot water for bath room No. 2located in south-east room of basement.
No. 31	Shuts off well water for bath room No. 2 located in south-east room of basement.
No. 32	Shuts off soft water for bath room No. 2 located in south-east room of basement.
No. 33	Shuts off soft water for bath room No. 1 located in south-east room of basement.
No. 34	Shuts off well water for bath room No. 1 located in south-east room of basement.
No. 35 & 36	Shuts off hot water for bath room No. 1 located in south-east room of basement.
No. 37	Shuts off well water south-east sill cock located in south-east room of basement.
No. 38 & 39	Shuts off hot water for bath room No. 3 located in south-east room of basement.
No. 40	Shuts off soft water for bath room No. 3 located in south-east room of basement.
No. 41	Shuts off well water for bath room No. 3 located in south-east room of basement.

Chart for the Property Owner, Showing the Location of all Valves in the House, Given as Part of the Halsey Installation.

anything in a year's time? All the questions are readily answered in the Halsey system of accounting, for the three classes of work are kept separate. So another point worth remembering in this shop's system is the division of accounts.

Buys in Carload Lots.

But how about the material that is bought in such large quantities; is it just bought, charged to a job, and anything that is left over looked on as "velvet," as we sometimes hear it called? Not here. As an example let us see how an order is figured and placed on the job. First of all, of course, the amount of material required is estimated, and estimated very carefully. Then to this is added a ten per cent reserve for any possible contingencies, and the order is shipped off to the wholesale house. An office form, bearing the job number, is used for this order, and the jobber that fills it checks off all the items as the car is made up. It is ordered shipped to the job, and upon its arrival there is checked over by the foreman or superintendent in charge, and after he has O. K.'d it, it is sent into the office. Here it goes into a folder that contains all the other orders and charges on that job, and the amount of the goods actually shipped is charged on the books to the job. Unless it is otherwise noted then, the whole bill of goods will be charged to the job.

But there is a ten per cent reserve figured on this piece of work, and as the construction goes along, it appears that the ten per cent will be available for use on some other place. It is taken off the first job, then the amount is credited to the first job and charged to another if it is to go on a piece of contract work, or charged to stock if it is to be used on repair work. In the latter case it is then charged to the job and credited to stock as it is taken out.

For the sake of convenience, a small spike file is kept on the desk out in the shop, and when material is removed for any reason from one job to another, or when it is drawn from stock for a job, a memorandum is made and stuck on the file. At the end of the day these are collected and applied to the proper accounts. An interesting detail in connection with the charging of the bills to any one job is the folder system that is employed. For every piece of work under construction two folders are kept in the files. One of these is for all communications and contracts relative to the work, while the other contains all bills for material and labor that are to be charged against it.

For further convenience, and to obviate any delay in obtaining needed materials, a form is provided on which the foreman on a job can order supplies. On this the job number is used, and the order made out in triplicate—one copy for the jobber, one for the foreman himself and still a third to be sent into the office. This is then placed in the "Materials" folder, to be charged.

All goods taken out of stock are charged at the market price, for, as Mr. Halsey says, "The material is only worth what it is quoted on the market, and there is no use in fooling ourselves. Our inventory of stock on hand sets the value at just what an appraiser from outside the company would set it." Speaking of the inventory, it is divided into three classifications: (1) tools and shop equipment, (2) materials and (3) office equipment. This division is made to allow for the charge for depreciation of regular equipment.

Extra Service on Residence Work.

The mysteries of so-called cheaper grade of work in plumbing, the Halsey Company has never been able to solve, so that they now go in largely for highest grade residence and large industrial work. Mr. Halsey emphasizes the fact that a bid is never placed on price alone, for if they take a contract it is with the understanding that they do the work in the Halsey style, which, to quote the company slogan, "is to plumbing, what Sterling is to silver."

It is the company's claim that they put in five valves to the ordinary job's one, and all this is done for the convenience of the owner, so that he will not be obliged to shut off the whole house, for a defect in one bathroom, or so that he will not have to shut off the entire bathroom to repair one faucet.

A gate valve and drip is put at the bottom of every riser, the valve is numbered with a small metal tag, and a chart is made out, showing the number and location of each valve, and telling the rooms and fixtures it controls. This chart, a sample of which is shown in the illustration, is then printed on a card in a permanent form and a copy of it given to the owner of the house. So if anything goes wrong with the plumbing, the owner, instead of calling for the plumber and sitting down to watch a torrent of water pour through the ceiling until he arrives, can go to the chart, locate the right valve instantly, and turn it off before any damage is done. He can send for the plumber then, but while he is waiting

for his arrival he need not be annoyed by having all the fixtures in the house without water.

Another touch that you sometimes find in a plumbing job, and sometimes don't, is a complete set of strainers in every horizontal line in the basement, located just before the valve at the foot of the riser. This takes out all particles of sediment and mineral deposits that would have a tendency to get under the seat in the gate valves and cause them to leak, and it also saves the packings, for there are no small particles of grit to hasten their deterioration.

Another pet scheme here is overhead plumbing. No supply pipes are run under the basement floor, they are all carried overhead from the place where they pass through the meter. One objection that is often heard in connection with overhead piping is that the sweat makes an annoying dampness on the basement floor. This is overcome, however, by using the proper kind of pipe covering.

In the matter of running the sewer line, a system is followed through on every residence job. What has been called a "double sewage" system is installed. It has often been the experience of home owners that the city sewers, especially in a section that has built up rapidly, are all right under ordinary conditions but that in time of storm they are wholly inadequate to carry off the surplus surface water, thus causing back water and flooded cellars. Under the Halsey plan, the house sewage is carried through one pipe, through the trap and a back water valve before the drains from the roof conductors are admitted. This makes it impossible for the water to flow back into the cellar and allows the sewage to pass out at all times.

Quality More Important Than Price.

These are just a few of the standards of practise in the Halsey code, and it is self-evident that when work of this kind is done it cannot be done on a purely price competition basis. It can only be done on the kind of a job where all of the extras are appreciated to the extent that the owner is willing to pay for them. And the architect, too, must see the advantage in this grade of work, and it is for this reason that Mr. Halsey says, as we have mentioned, that he would like to make his office a place where any or all of the architects could come and consult on plumbing matters, for then they would themselves become advocates of only the best in plumbing, and their influence would go a long way toward the elevation of the work of the sanitary engineer in the minds of the builders and the public.

And does this pay? No doubt about it. It has paid for thirty-seven years and the firm's policy has earned for it a reputation in Milwaukee and all over the state for honesty, and dollar for dollar dealing on any job—large or small. This fact was attested to fourteen years ago when W. H. Halsey was elected to the office of President of The National Association of Master Plumbers as "Honest" Bill Halsey.

To be able to handle from a quarter to a half a million dollars worth of work a year, some of it contract, some cost plus and some job work, and to be able to tell just exactly where each job and each kind of work stands at all times is what, in our opinion, is making a real scientific business out of plumbing, and this is what this company has achieved.

CUTTING THE CURBSTONE PLUMBER.

By "Joe" Osier.

Every time I hear men of the trade hammering the curbstone plumber, I think of what Mark Twain said:

"There is a lot of talk about the weather, but nothing done about it."

And, replying in the language of Dumb Dora, the Dancing Doll, I ask—

Fellows, ain't it the truth?

You know, since I graduated into the daily shaving class. I've heard that song and chorus about the curbstoner; about his worn-out pipe wrench, his brown derby and his utter disregard of overhead.

I've heard endless exhausting speeches, read columns of printed matter and engaged in hundreds of fanfests and—

The topic and the theme and the subject has always had to do with the wildcatting, curbstone plumber who thinks overhead is a—

Dress suit—a dance—a dessert or a mess of trumped up foolishness.

Yeh! there is a lot of talk and nothing done about it—for—

As far as I can discover (not being in the exploring business) the curbstoner is going blithely down the road—

Cutting, slashing, and eliminating everything including—

Time, materials, chewing tobacco and overalls.

Show him an open door and he'll mosey in and start to work. The size of the job, the amount of money involved, the exacting demands of the builder who knows—

Does not concern him. He is a plumber with a purpose and that purpose will not be accomplished until he is—

Throwing a mean hand on a wheel chair at the county poor farm.

I believe, regardless of the number of words it takes to believe, that—

The curbstoner will always be with us, despite his reverses and

"The slings and arrows of outrageous fortune"—

Unless the organized Master Plumbers and Heating Engineers of this Great Commonwealth—

"Take arms against a sea of troubles, and by opposing end them."

(Cheers.)

The heads of the various organizations, representing men of the trade, must lead the fight and bear the battle's brunt.

Let the cannon roar and the blood run in Legislative and Council halls until—

Every curbstoner shall have been bonded or licensed or driven—

Into the fold or from the field.

The lists are ready—the steeds are champing at their bits; the knights, heavily armored, await the signal—

Let us to the business at hand.

If the outlaws cannot be converted—they can be made hard to catch and—

Do not forget, the security of the legitimate men of the trade will not be assured until every man engaged in the game—

Whether in the office or on the business end of a pipe wrench, is thoroughly convinced that—

Overhead should be figured in with the fixtures and not out of the profits.

Overhead is overhead and profit is profit and—

The twain should never meet, because—

When they do, ye master plumber is most liable to hear the winter winds whistling through his worn-out jeans as—

He wonders where in the name of a name the summer's work, the summer's efforts and the summer's earnings have—

"Went."

Yea, verily, in this fearless column, I say unto you, the day of the curbstone plumber—his battered derby—his sack and his stub pencil should be—

Fast finished.

Joe Buggy, of Omaha, has been awarded the contract for the installation of a $15,000 plumbing system in the Auto Electric & Radio Corporation building in that city, and the Campbell Heating Company, Kansas City, Mo., has secured the contract for the installation of the heating system, a $16,000 job.

THE CHECKLESS METHOD *of* RETURNING CONDENSATION TO A LOW PRESSURE BOILER

Being Answers to and Comments On Two Questions Recently Received By Our "Questions and Answers" Department

IF WE may judge by the character of some of the inquiries received, there are many men identified with the business of installing heating apparatus who should ask of themselves the question: Are we of the old school of steamfitters so firmly set in our ideas and methods that we are unwilling to profit by the experience of engineers of known ability, who have spent much time and effort to devise a method of overcoming a serious condition so often found in installations of low pressure gravity steam heating systems?

We are led to accept such a conclusion by the receipt of several letters pertaining to the so-called "checkless system" of returning the water of condensation to a low pressure boiler. The following letter from "M" in Kansas was received a short time ago:

"M.'s" Letter.

"Editor, "Domestic Engineering":—I note with interest the 'plaint' of W. K. B., of Iowa, in your issue of April 22nd, page 147, and also your reply. I will state that your reply is the only one you could make under the circumstances. I was enamored of the idea of the 'loop' or 'trap' entering equalizer, etc. I also 'fell' for it. I wish I had not, but I will admit it did look good, extra good, and furthermore I believe it is a correct idea, if it can be made to work all the time, but some times it doesn't work.

"An old timer said to me one time: 'Steam is funny,' and I believe it is, in more ways than one or two.

"The sketch shows the connections on a 2-loop (from high point of main), on a single pipe, low pressure, gravity job as we installed them on an alteration job, to overcome a bad water line, a water line that almost left the glass on a quick fireup, about ½ inch of water only would show with drafts open. If we closed the drafts, the water came back very quickly. Like a lot of single pipe, low pressure, gravity jobs, this job made a natural vacuum, and would often take air in through try cocks on water column, when we opened to try for steam or water. And it does it now, only in a more pronounced manner. Connected up this way the water leaves the boiler like a flash, and you cannot get a drop out of the low pet cock or gauge glass above drafts, and it comes right back. Where does it go to, and why?"

"M." submits with the above letter a sketch which shows a cast iron sectional steam boiler and the flow and return connections from and to it. On this sketch the following information is noted: "The vents used on the returns are good big Hoffman vent valves. The boiler is about 25 per cent too small for the job, however, it is a fast steamer and a *real* boiler. I believe the water goes up into the main and is held there by the natural vacuum the system creates. The job heats O. K. without knocking at any time, unless a radiator should fill up owing to a valve being slightly open. The 5-inch main leaving the boiler supplies one 4-inch and one 3½-inch loop which are graduated to 3-inch and continue this size to the end."

It is quite impossible to reproduce the sketch as submitted as it is drawn partly in section and partly in elevation. A cast iron sectional boiler with cast iron flow and return headers is shown. These headers are connected to the sections by nipple and lock-nut connections. From the steam header a 5-inch main is taken which supplies one 4-inch and one 3½-inch main. This 5-inch pipe is about 40 ft. in length. At the rear end of the steam header a 3-inch equalizing pipe connects this header with one of the

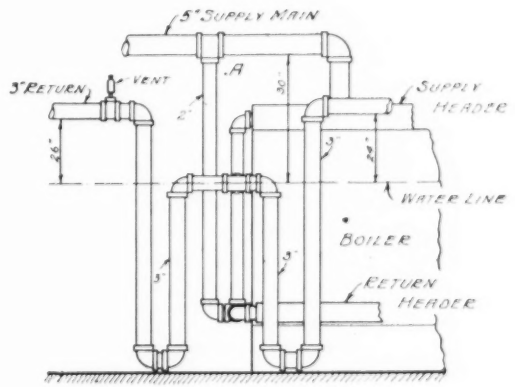


Fig. 1.

return headers at the side of the boiler. The sketch, Fig. 1, shows how the dry returns (one from either main) are connected, in the form of a loop, to the equalizing pipe at a point which is at the height of the water line of the boiler. It is this loop connection which correspondent condemns as being inaffective, claiming that the fluctuation of the water line is even worse than it was before this method was used. On the sketch submitted each return seems to be connected to the equalizing pipe at exactly the same height or point and we are therefore led to think that a tee is used bull-head at this point as we have shown on the sketch.

Now, it may be well to review some of the apparent conditions to be found on this installation. The boiler, according to correspondent, is 25 per cent too small for the job. The length of the 4 and 3½-inch sub-mains is not given nor is the amount of radiation supplied by each main stated, but we do know that one 5-inch main, area 19.635 sq. inches is supplying one 4-inch main, area 12.566 sq. in., and one 3½-inch main, area 9.621, or a combined area of 22.187 sq. in. If the 4-inch and 3½-inch mains are of the right size to supply the amount of radiation connected, and we assume that they are, the pipe supplying them should be 6 inches in size instead of 5 inches, as at present. The dry return from one main comes back to a point near the boiler at a height about 26 inches above the water line, and

the dry return from the other main comes back about 24 inches above this line. This fact, taken together with the different drop in pressure in each main, shows that the point of equalization is different in each loop? The loop seal to be effective should be constructed as illustrated by Fig. 2.

We venture the opinion that it may be possible that al-

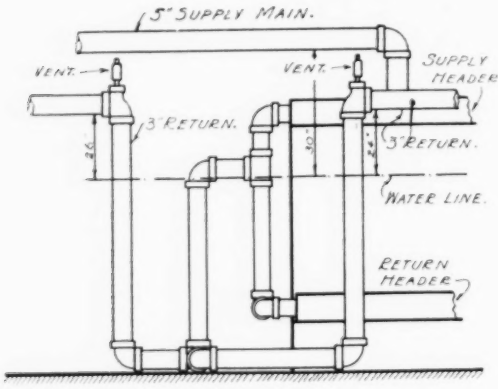


Fig. 2.

though the water leaves the water glass it does not leave the boiler. A condition may be created (possibly the vacuum suggested) which draws the water from the glass. Water backed into, or sucked into, the return to the boiler would not return to the boiler instantly the draft is closed off.

That the advantage of using the loop or checkless method is not understood nor appreciated by many fitters is shown from the following letter received from another correspondent, "S." in Iowa:

Letter from "S." in Iowa.

"Editor, "Domestic Engineering":—Will you kindly look over the enclosed sketch of boiler connections? I installed this job last fall and it worked perfectly, but the customer has a report from the insurance company inspector, to the effect that the equalizing pipe enters the return line below the water line, and must be changed. Will you kindly advise what changes are necessary?"

* * *

The boiler connections to which our attention is directed are shown on the sketch, Fig. 3. Return connections alone are shown. This boiler is one having a cast iron steam header on the top and a cast iron return header on either side. If the pipe sizes used are adequate for the work and a sufficient distance is maintained between the end of the dry return and the water line, there seems to be no reason why the system should not work properly. Not knowing the size of the installation, nor the conditions of the work, we are unable to judge whether the method used will give satisfactory service. It seems to represent good steam fitting practice.

Fig. 4 illustrates the loop or checkless method as recommended by the boiler manufacturers and engineers. In connection with the sketch it may be well to quote some paragraphs from the report or statement of the engineers responsible for the promulgation of the loop method:

"One of the prolific causes of cracking of the parts of low pressure steam heating cast iron boilers is an improper water level in the boiler. In fact, a most important problem confronting the heating engineer in the installation of a low pressure steam heating system is the maintenance of a proper water level in the boilers used on the system. The principle that a fluid in any interconnected system of pipes or other containers tends to assume a uniform level when the pressure on the surface of the fluid is uniform is the one most to be relied on to accomplish the desired result. This is so because gravity, upon which the principle depends, is infallible.

"If the condition of uniform pressure on the water in a steam heating system could be maintained, no difficulty would ever be experienced in keeping a safe water level in steam heating boilers using gravity returns."

"Unfortunately, many conditions arise in practice that tend to prevent such uniformity in pressure. Owing to frictional resistance the movement of steam or other fluids through pipes cannot be maintained unless there are differences in pressure. The greater the volume of steam to be moved from one point to another through a pipe or system of pipes in a given time, the greater the difference in pressure required at the two points considered.

"In a gravity return system the means used to compensate for the difference in pressure required at the steam outlet of the boiler and in the return pipe near the boiler is a head of water supplying a pressure sufficiently in excess of this difference in steam pressure to cause the condensation to flow to the boiler. As long as the volume of water required for this head is such that it may be safely withdrawn from the boiler, without seriously lowering the level of the water in it, the system will work satisfactorily.

"If a pipe connects the steam space of a boiler with a point where the return connection is usually made, in effect this pipe becomes a part of the boiler the same as adding a section to a sectional boiler. The return connections can be attached to this pipe at a height corresponding to the safe working water level in the boiler and thereby secure the same result as would be obtained by delivering the water directly to the boiler at the water line although it is actually introduced at the usual bottom connection.

"This kind of connection gives an additional safeguard, aside from preventing the water backing out of a boiler, in that, should the stop valve in the steam outlet be closed while the boiler was steaming, the boiler would still be connected to the system through the return connections. (The writer to make this statement somewhat clearer would say that, should a check valve be used, and this valve be fully operative, the boiler, under the conditions noted would accumulate a dangerous pressure. With the checkless system installed the pressure would be relieved by the excess pressure backing the water into the heating system.) While

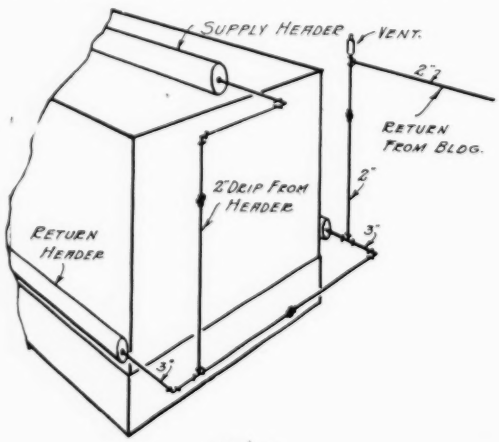


Fig. 3.

this arrangement of piping is not intended to obviate the need for proper safety valve protection it would tend to prevent the accumulation of a dangerous pressure with an inadequate or inoperative safety valve. Also, under such conditions, with the steam pressure finding relief through the return pipe, the water hammer which would then occur in this pipe would attract attention and indicate that something was wrong.

"The illustration (Fig. 4) shows this method of connecting returns which may be applied to a single boiler or to two boilers. The steam connection for the equalizing pipe is shown connected to the steam outlet pipe. It is, of course, not necessary to make the connection in this exact manner. The upper end of the equalizing pipe could be connected to the steam manifold or drum, or to the steam space of the boiler, but in any event there must be no valves on this equalizer connection that could shut it off from either the steam space or water space of the boiler."

The letter of "M." was inspired by the inquiry of W. K. B., Iowa, published in the April 22nd issue of "Domestic Engineering." W. K. B. had replaced an old boiler with a new one and had used the checkless method of connecting the return with the result that the job hammered and did not function properly. Prior to this, and with the old boiler connected without checks of any kind, the job worked quietly and perfectly. W. K. B. submitted no sketch with his letter nor did he give any data that would help us to diagnose the trouble. We replied regretting this fact and suggested that perhaps some connection had been wrongly made or that the return was not properly vented. We further said:

"The balanced loop, intended to replace the frequent and often wrong use of check valves, was suggested by the National Boiler and Radiator Manufacturers Association as a means of preventing the water from backing out of the boiler into the returns, thus allowing the boiler sections to become overheated and to fracture from excessive strain, or from the sudden returning of water which had cooled while in the return piping."

There are several causes for water leaving a low pressure steam boiler. If the velocity of the steam at the outlet of the boiler is such that the boiler primes—that is passes into the piping entrained with the steam—a good size of equalizing or drip connection from the steam header to the return will usually correct the trouble. It is better, or we might say that it is best also, to use a sufficient number of steam outlets to lower the velocity of the steam leaving the boiler to possibly half that in the steam main. We are assuming that the priming is not due to oil, grease, or scum, on the water in the boiler. In this event the boiler should be blown off a sufficient number of times to scour it clean.

When pipe connections of sufficient size are used and the proper height or distance between the end of main or dry return and the water line is maintained the above causes from uncertain water lines are easily corrected.

That the checkless method may be studied, we again illustrate it and cannot too highly recommend it to all steam fitters.

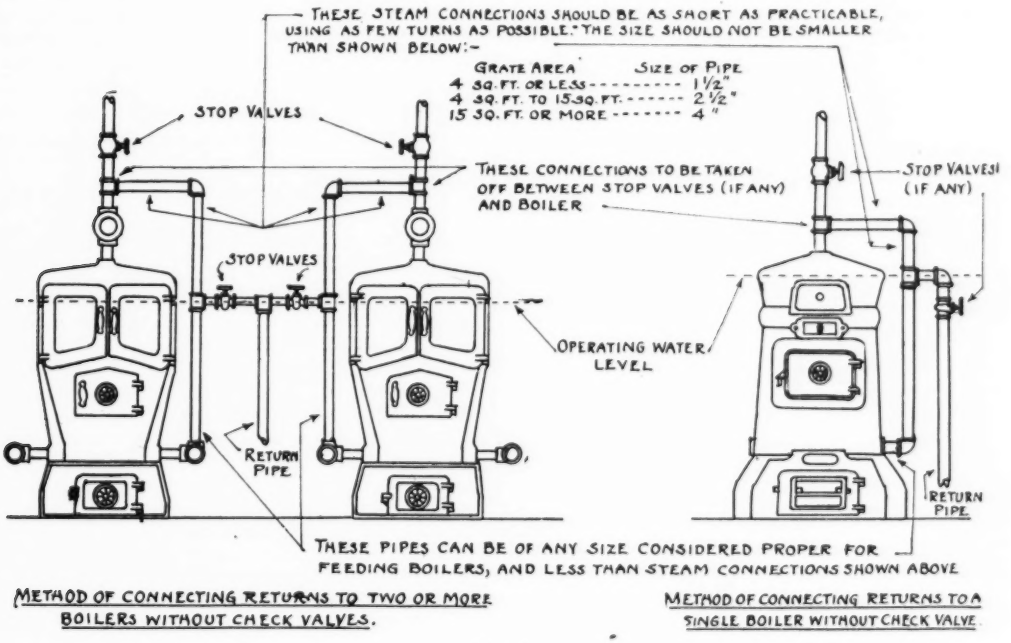

THESE STEAM CONNECTIONS SHOULD BE AS SHORT AS PRACTICABLE, USING AS FEW TURNS AS POSSIBLE. THE SIZE SHOULD NOT BE SMALLER THAN SHOWN BELOW:-
GRATE AREA
SIZE OF PIPE
4 SQ. FT. OR LESS - - - - - - - - - 1½"
4 SQ. FT. TO 15 SQ. FT. - - - - - - 2½"
15 SQ. FT. OR MORE - - - - - - - 4"
STOP VALVES
THESE CONNECTIONS TO BE TAKEN OFF BETWEEN STOP VALVES (IF ANY) AND BOILER
STOP VALVES (IF ANY)
STOP VALVES
OPERATING WATER LEVEL
RETURN PIPE
RETURN PIPE
THESE PIPES CAN BE OF ANY SIZE CONSIDERED PROPER FOR FEEDING BOILERS, AND LESS THAN STEAM CONNECTIONS SHOWN ABOVE
METHOD OF CONNECTING RETURNS TO TWO OR MORE BOILERS WITHOUT CHECK VALVES.
METHOD OF CONNECTING RETURNS TO A SINGLE BOILER WITHOUT CHECK VALVE

Fig. 4.

NAMED AUDITORIUM TRUSTEE.

Charles H. Hobson, of Lowell, Mass., has been named by Mayor Brown of that city as trustee of the Memorial Auditorium of that city for a term of three years. This is a new board just created, consisting of three trustees. Mr. Hobson, who is head of the plumbing firm bearing his name, was a member of the city's street railway commission and has been active in Lowell politics.

MASTER PLUMBERS NOT TO AFFILIATE WITH AMERICAN CONSTRUCTION COUNCIL.

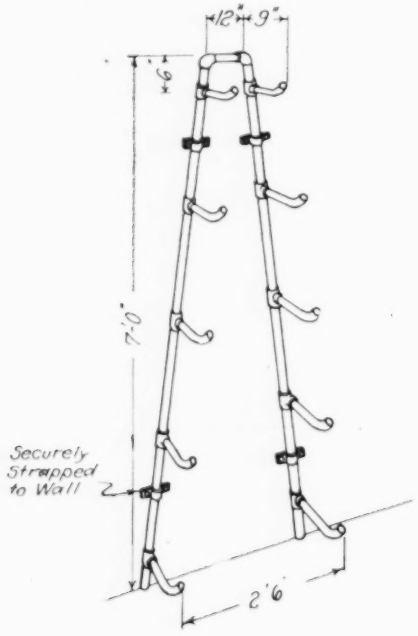
The committee appointed by the National Association of Master Plumbers for the purpose of investigating the advisability of affiliating with the American Construction Council, has completed its investigation and has reported unfavorably upon such a move at the present time. This conclusion was reached after a careful and impartial investigation of the Council during its recent session in Washington, D. C. In the opinion of the committee the advantage to be gained through such an affiliation is so slight as to be disregarded. The personnel of the committee was as follows: Walter D. Nolan, chairman; D. F. Durkin, H. J. Farrell, T. E. O'Brien and F. W. Quinter.

The J. J. Hanighen Co., of Omaha, Nebr., has been awarded the contract for the plumbing and heating work in the Bankers' Reserve Life Co.'s new building in that city. The contract amounts to $75,000, and was awarded August 14th.

SIMPLE RACK RESULTS IN BIG SAVING OF PIPE.

IN every plumbing and heating shop there is a constant accumulation of short pieces of pipe. Carelessness in regard to these materials often results in considerable losses. It is reprehensible indeed to put a long piece of pipe into a vise and cut from it a short piece to measure when in all probability there are perhaps a score or more of pieces practically the exact size lying somewhere in a forgotten corner.

Journeymen turning out work in the shop know well enough that these short pieces are available, and sometimes they do indeed make a casual search, but if the piece they wish is not immediately found, they will pick up any length at hand and cut their requirements. They think that they are doing well enough, if when they need, say, a piece 12 inches in length, they hunt long enough to find one, say, 20 inches long; but even that means a loss of about 8 inches of pipe, particularly if the piece cut off has no thread on it



at all. It is true that some shops save even these short pieces for the sake of later threading them into nipples; but this is not considered real economy, because good clean nipples properly reamed and threaded can be purchased cheaper from manufacturers than they can be cut by hand.

It is a most efficient arrangement and economy in any plumbing and heating shop, therefore, if some simple method will make it easy to find any short piece of pipe that is wanted for some work in hand. The piece required may be 10 inches or 14 or 18, and certainly it is the most sensible thing to have that piece handy and instantly found, especially since it is almost a certainty that it is somewhere about, if it can but be found. The accompanying illustration shows a rack which was devised by a master plumber in New York state, and used successfully for many years.

The rack is so constructed that all short pieces of any size of pipe are slipped into a particular place, with all pieces together of approximately the same length, and the total supply of them always readily seen in a moment. The rack is so graduated that the size of the various lengths will not differ more than a few inches. Thus, when a workman should require anywhere in his doings about the shop a piece of pipe of about 14 inches, say, whether it be black or galvanized, or ½-inch or ¾, or any other diameter, he looks to his rack and will find at once all the pieces on hand of approximately that size. Of course, if there should not be any pieces of the 14-inch length in the rack, he could then take a piece of 16 inches or 18 inches and cut it down to measurement; but he would have the satisfaction of knowing that in doing so he would be guilty of no needless waste.

The rack is constructed of 1-inch or ¾-inch black pipe for the uprights, with ½-inch tees for the arms, and the arms are made of ½-inch pipe. These arms are bent up at the outside end and an elbow is affixed to take up the connecting piece which stretches from one arm to the other. This connecting piece can be of a smaller sized pipe; yet the arms may be made with merely the bend on the outside end and without the use of a connecting piece across. The connecting pieces, moreover, may be placed across only every third or fourth arm so as to hold the rack steady.

This arrangement provides a rack for all random short pieces varying in length from 10 inches up to 2 ft. 6 inches or over. All pieces approximately the same length will be found together, whether of black or galvanized, and in different diameters.

BLACKBOARD EPIGRAMS

SPEAKING of Blackboard Epigrams, R. L. Eshelman, good plumbing and heating dealer of Abilene, Kansas, says he knows the power of the epigram. "For the past year," writes Mr. Eshelman, "I have put out a monthly calendar, with epigrams, and have found it quite effective as a 'notice getter.' I believe the Blackboard Epigram stunt will be effective in the same way."

To those who overlooked page 143, July 22nd issue of "Domestic Engineering," and who likewise overlooked page 272 in the issue for August 12th, be it said that the Blackboard Epigram idea, briefly put, is this: Place a blackboard, three or four feet long and two or three feet wide, out in front of your store, where most people who pass may see it. Every morning write or print on this blackboard an epigram. Write it in letters large enough to be read from the middle of the street. Be sure that there is a daily change of epigram. People who pass will read the epigrams and talk about them. And every time they read and talk they are sure to think about the dealer who owns the blackboard.

Fourteen epigrams have been printed in the before-mentioned issues. Seven fresh epigrams will be printed each week. They will be selected to give a deal of variety. Here follow this week's epigrams:

A wise man does not need advice, and a fool will not take it.

* * *

Women love us because they think they see something in us—which isn't there.

* * *

Don't be discouraged. Even the bridegroom is not the best man at a wedding.

* * *

Breathe more, bathe more, laugh more, work more.

* * *

Many who cry for justice would howl if they got it.

* * *

A vacuum cleaner is a broom with a college education.

* * *

To get paid for more than you do, do more than you get paid for.

PUMPS

The Development of Apparatus of Indispensable Use to the Plumbing and Heating Contractor

By Ed. Cunningham

(Continued from Page 142 in the July 22nd Issue.)

AS indicating the variation that may exist in the efficiency of a centrifugal pump, when operated at rates other than that at which the pump was designed to be operated, Fig. 18 gives a good illustration of a typical test result on a No. 6 Goulds three-stage centrifugal pump operating at 1740 r. p. m. constant speed.

The following quotation relative to centrifugal pumps is made from bulletin No. 122 of the Goulds Manufacturing Company, and is so well stated as to cover the subject most thoroughly and intelligibly:

"The centrifugal pump of today is a development of the last twenty years. Although 1680 is the year given when the first centrifugal pump was built, and 1818 the year when the first crude pump of this type (called the Massachusetts pump) was built in this county, it was not until recent years that this type of machine was considered seriously. It was due probably to the fact that a centrifugal pump is a relatively high speed machine, and there was no motive power well suited to it.

With the introduction of the electric motor and the steam turbine, conditions have changed. These high speed machines stimulated the development of the centrifugal pump and the demand for this type of pumping machinery is steadily increasing.

Definition.

Pumps that depend for their action upon centrifugal force or the variation of pressure due to rotation are termed centrifugal pumps.

Other factors, however, have an important effect as will be shown later.

Classification.

Centrifugal pumps may he divided generally into two classes: (a) Volute pumps, and (b) Turbine pumps.

A volute pump is one in which there is no diffusion nor guide vanes and where the casing is spiral in shape. The casing may be considered as a single guide vane passage.

The spiral casing or volute, as it is sometimes called, guides the water as it leaves the impeller to the discharge pipe and is so designed as to convert gradually the velocity of the water leaving the impeller into pressure.

A turbine pump is one in which the impeller is surrounded by a circular diffuser, which contains ribs forming water passages, sometimes called guide vanes. These vanes are so shaped that they provide gradually enlarging passages which convert the velocity of the water leaving the impeller into pressure.

Theory.

The theory of the action of a centrifugal pump may be well illustrated by the old simile of the "Boy and Bucket." The boy whirls the pail of water about his head and not a drop is spilled, provided the pail is moving fast enough. The force that holds the water against the bottom of the pail is called "centrifugal force."

Now, suppose that a hole is punched in the bottom of the pail. A stream will flow out. The stream would be continuous if the boy's arm were a pipe supplying water to the pail.

The boy's arm is a suction pipe, the pail is the impeller throwing a stream, and the casing of the pump has been introduced to guide the stream in one particular direction to the discharge outlet.

Crudely this is the story of the centrifugal pump.

Suppose, now, there is a body—say a pail of water on top of a building 120 ft. from the ground. Suppose it is pushed off—it would fall to the ground with an increasing speed and it would finally strike the earth when moving at a certain rate of speed or velocity. Let us say that it was moving at the rate of 5,274 ft. per minute when it struck. Now, sup-

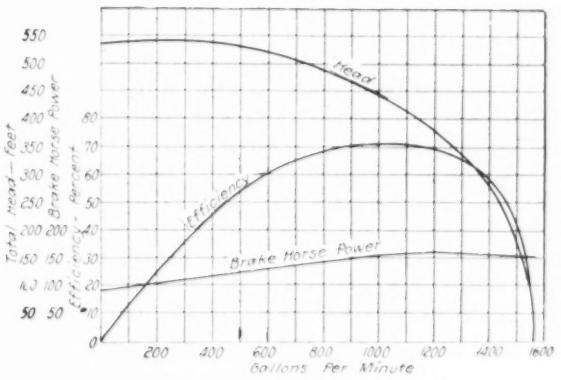


Fig. 18.

pose we wish to throw this pail of water from the ground to its original position on top of the house. In order that it reach this elevation, we have to start it with an initial velocity or speed equal to the speed it had attained at the moment it struck to the ground in its fall, i. e., 5,274 ft. per minute. The formula for the law which gives the velocity of a falling body is as follows:

$$V^2=2gh$$

In which V=Velocity of the moving body in ft. per second.

g=acceleration of gravity=32.2 ft. per second

h=head in ft. or distance which it falls.

Substituting the values used in the above example in this formula, we find that the velocity that we have assumed, of the falling pail was correct.

$$V^2=2\times32.2\times120=7{,}728$$

$$V=87.9 \text{ ft. per second.}$$

Then as there as 60 seconds in one minute:

$$87.9 \text{ ft.}\times60=5{,}274 \text{ ft. per minute.}$$

It is this law or formula that is used in determining the speed of the impeller in the pump. The water, as it leaves the impeller to be thrown to a certain height, must have the same velocity as it would have if it fell from that height as just shown. This law may be stated as follows:

The speed in ft. per minute of a point on the periphery of the impeller should be equal in velocity to water falling from the same height as the head pumped against.

Let us take an actual example:

The impeller of a certain pump is 13.5 inches in diameter. At what speed must the pump operate to deliver water against a 120-ft. head? Substitute this head, 120 ft., in the formula:

$$V^2=2gh$$
$$V^2=2\times32.2\times120=7{,}728$$
$$V=87.9 \text{ ft. per second}$$

or

$$87.9\times60=5{,}274 \text{ ft. per minute.}$$

Therefore, we find that a point on the periphery of the impeller must have this speed. The diameter of the impeller was given as 13.5 inches. The number of ft. in the circumference of the impeller is:

3.1416 (a constant) $\times$ diameter (13.5 inches)

But let us convert 13.5 inches into ft.; as there are 12 inches in one ft.:

$$\frac{13.5 \text{ inches}}{12}=1.125 \text{ ft.}$$

Then the circumference of the impeller in ft. is $1.125\times3.1416=3.54$ ft.

Now 3.54 ft. $\times$ the number of revolutions of the impeller equals the velocity of the impeller in ft. per minute.

Therefore, this figure 3.54 $\times$ r. p. m. must equal 5,274. Hence:

$$\text{r. p. m.}=\frac{5{,}274}{3.54}=1{,}490 \text{ r. p. m.}$$

which is the speed at which this pump with a 13.5-inch impeller must run to discharge water against 120 ft. head. It is plainly seen from this that with the same conditions of head, the smaller the diameter of the impeller, the greater must be the speed of the pump and vice versa.

It will be noticed that nothing has been said in the above example about the amount of water the pump would discharge. The capacity of the pump depends on the size of its openings—suction and discharge—and on the size of the casing. It also depends on the width of the vanes of the impeller, just as the larger the hole punched in the bottom of the pail, the more water is discharged. The pump is only allowed to pass an amount of water that will not cause undue frictional losses due to high velocity. The designer selects the correct size of casing and the inlet and outlet sizes of the pump in much the same manner as the salesman selects the size of pipe, from the friction tables, he is going to use on a job. It is safe to say that the velocity of the water at the discharge of the pump should be about 10 to 12 ft. per second. This is a good design. However, it may vary from 5 to 15.

Let us now consider the so-called "affinity laws" that govern the action of a centrifugal pump.

When the diameter of the impeller remains the same, or constant:

1. The quantity will vary as the speed.
2. Head will vary as the speed squared.
3. Power will vary as the cube of the speed.

Let us illustrate these rules:

A pump running at 1,700 r. p. m. delivers 500 gallons per minute against 60 ft. head and requires 15 h. p. What will it deliver at 1,420 r. p. m.?

Let X=the new capacity.

$$1700\div1420=500\div X$$
$$(1)\quad 1700X=1420\times500$$
$$X=\frac{1420\times500}{1700}$$
$$X=418$$

Then, at the reduced speed of 1420 r. p. m., the pump will deliver 418 gallons per minute.

Now, what is the head at this speed?

Let X=new head

$$1700^2\div1420^2=60\div X$$
$$1700^2\times X=1420^2\times60$$
$$(2)\quad X=\frac{1420^2\times60}{1700^2}$$
$$X=\frac{1420\times1420\times60}{1700\times1700}$$
$$X=42 \text{ ft. (approximately),}$$

which is the head at 1420 r. p. m.

The power has, of course, decreased at this low head and smaller capacity.

By using the above rule, we may find it in a like manner:

Let X = new power.

$$1700^3\div1420^3=15\div X$$
$$(3)\quad 1700^3\times X=1420^3\times15$$
$$X=\frac{1420^3\times15}{1700^3}$$
$$X=\frac{1420\times1420\times1420\times15}{1700\times1700\times1700}$$
$$X=8.7$$

which is the horse power under the new conditions. Hence, we find by changing the speed of this pump from 1700 to 1420 r. p. m.

(a) The capacity changed from 500 to 418 gallons p. m.
(b) The head changed from 60 ft. to 42 ft.
(c) The power changed from 15 h. p. to 8.7 h. p.

As stated, these results were obtained by changing the speed but the size of the impeller was kept the same.

Now, if we hold the speed constant and change the diameter of the impeller, we find that the

(4) Quantity varies as the diameter.
(5) Head varies as the square of the diameter.
(6) Power varies as the cube of the diameter.

Let us say the diameter of the impeller in the previous example was 8 inches. At this diameter and at 1700 r. p. m. it delivered 500 gallon per minute against 60 ft. head and 15 h. p. was required.

Now, suppose we cut this impeller down to 6 inches in diameter and then run the pump at 1700 r. p. m.

The new capacity, head and power is found by the above rules in the same manner as they were found in the previous example.

$$500\div X=8''\div6''$$

(4) X=375 gallons—(the new capacity)

The new head is found:

(5) $60\div X=8^2\div6^2$

X=34 feet—(the new head)

The power required is:

(6) $15\div X=8^3\div6^3$

X=6.3 h. p.—(the new horse power)

Then by reducing the diameter of the impeller from 8 inches to 6 inches, the

(a) Capacity was changed from 500 to 375 gallons p. m.
(b) Head was changed from 60 ft. to 34 ft.
(c) Power was changed from 15 h. p. to 6.3 h. p.

Problems.

1.—What would be the diameter of an impeller in a centrifugal pump running at 1,420 r. p. m. and discharging

water against a 160 ft. head? Answer: 13.32 inches approximately.

2.—A centrifugal pump delivers 1,000 gallons of water per minute at 60 ft. head and requires 45 h. p. at 1,750 r. p. m.; what would it deliver when running at 1,600 r. p. m., the impeller remaining unchanged? Answer: 915 gallons p. m., 50.2 ft., 34.4 h. p.

3.—If a pump with a 9-inch diameter impeller running at 2,000 r. p. m. delivers 300 gallons p. m. at 85 ft. head requiring 11.5 h. p., what would be the capacity, head and horse power required, if the impeller was cut down 1 inch in diameter but run at the same speed? Answer: 267 gallons p. m., 67 ft., 8.05 h. p.

We have seen how the water is elevated to a given head with a centrifugal pump by pre-determining the speed at which the impeller is to revolve. Our calculations have been for a single stage or single impeller pump only. We have considered the water entering the pump and impeller to have practically no pressure.

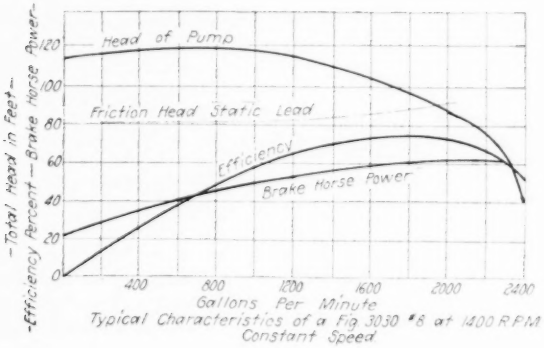


Fig. 19.

Suppose we had two single stage pumps each running at 1,480 r. p. m. and each discharging water at 120-ft. head. The velocity of the water, as it leaves the impeller of either pump, would be about 5,274 ft. per minute.

Now, suppose that the discharge of one of the pumps was piped to the suction of the other. We would find the velocity of the water leaving the impeller of the second pump to be 5,274 ft. per minute plus the head or pressure of 120-ft. produced by pump No. 1, or, in other words, the second pump would be delivering water against 240 ft. head. This is easily understood as the water leaving the first impeller and entering the second already has a pressure corresponding to the 120-ft. head and the second impeller imparts to it a velocity of 5,274 ft., which, together with the initial 120-ft. pressure, equals 240-ft. head.

If three or four pumps were connected in this manner the resulting head would be the sum of the heads of each pump. This really is a multi-stage pump, and the principle upon which all such pumps operate.

For the sake of simplicity, economy and compactness, the commercial multi-stage pump has all the impellers mounted in a single casing, but the action is identical with the example just quoted.

It might be well at this point to say a word in regard to the suction of a centrifugal pump. The plungers or pistons in a reciprocating pump occupy a certain amount of space. As the crank shaft of the pump is revolved, the plungers move and the space occupied by them becomes a partial vacuum. Due to atmospheric pressure on the surface of the supply, the water below rises and fills the space made vacant by the plungers and the pump starts to discharge water. Because of this positive action or displacement feature this type of pump seldom requires priming.

In a centrifugal pump this is not the case. The impeller may revolve but the air which fills the casing is not discharged. It is, therefore, necessary to exhaust the air (called priming) from the casing of the pump by some method, and the water then rushes in and the pump will start to discharge.

But why does the water continue to rise the pump? This can best be illustrated by the following example:

Imagine a pump full of water and standing at rest. Suppose the impeller is revolved. The water contained therein is thrown outward due to centrifugal force and the displacement of this water thus creates a partial vacuum. This is immediately occupied by more water entering through the suction pipe due to atmospheric pressure on the surface of the supply.

This action is similar to that of the reciprocating pump in that we may consider the water moving out of the impeller as the piston or plunger. The action is continuous and, therefore, the pump remains primed and continues to discharge.

Characteristics of the Centrifugal Pump.

In order to properly select or recommend a centrifugal pump for certain conditions, it is necessary to know the quantity of water the pump will deliver, the head that it will produce, the efficiency and horse power. These points can best be illustrated graphically (see Fig. 19). The three curves, labeled "Head of Pump," "Efficiency" and "Brake Horse Power," comprise what are known as the "characteristics" of the pump, and are obtained from actual test of the pump in question.

Let us suppose we had run such a test and obtained the following data:

Point	Gallons P. M.	Total Head in Ft.	Per Cent Efficiency	Brake H. P.	R.P.M.
1	0	111	0	28	1420
2	400	114	36	38	1420
3	800	114	52	44.5	1420
4	1200	110.5	65.5	51.0	1420
5	1600	102	72.5	56.5	1420
6	1800	95	73.2	58.5	1420
7	2000	86	72.5	60	1420
8	2200	76.5	70	61	1420

We will plot the "Head Curve" first.

Head Curve.

Starting at zero on the horizontal "Gallons per minute" scale, count the spaces vertically upward until the point, equal to 111 ft. total head is arrived at. Mark this point, which is point 1, or the "shut-off" of the pump, or point of no delivery.

At 400 gallons p. m. on the horizontal scale, count vertically upward until the value equal to 114 is reached. This is point 2.

The remaining points are plotted in a like manner. A smooth curve is then drawn through these points, which is the "Head" characteristic of the pump at a constant speed of 1,420 r. p. m.

Efficiency Curve.

As no water is discharged at "shut-off" the efficiency under these conditions, is of course zero. Starting at 800 gallons per minute, count the spaces vertically upward until a point opposite fifty-two on the efficiency scale is arrived at. This is another point 3′ on the efficiency curve. Again at 1,200 on the gallons scale, by counting upward point 4′ is determined, and similarly, for 1,600, 1,800, 2,000 and 2,200 gallons, points 5′, 6′, 7′ and 8′ are determined. A smooth curve drawn through these points is the efficiency curve of the pump.

Brake Horse Power Curve.

Beginning again at zero on the "Gallons per minute" scale, we read upward and locate a point 1″ opposite 28 on the Brake Horse Power scale. In similar fashion points 2″ to 8″ are located. The curve drawn through these points is the "Brake Horse Power" curve of the pump.

Discussion of the Characteristics.

By means of this curve it is possible to determine intermediate capacities and heads not obtained from test readings.

For example, we find the head corresponding to 1,680 gallons per minute is 90 ft. This is done by projecting vertically upward to the "Head Curve," at 1,680 gallons per minute, and reading the value on the head scale corresponding to this point. Conversely, starting from 90 ft. on the head scale and projecting across horizontally, we strike a point on the Head Curve immediately at 1,920 gallons per minute on the gallons scale. Therefore, the pump will deliver 1,920 gallons per minute when the head is 90 ft. The maximum capacity that the pump will deliver is about 2,400 gallons per minute.

By studying the shape of the "Head Curve" we see that the output increases as the head is reduced, but this is only true within reasonable limits. If the head is reduced to zero, a condition never obtained in actual practice, the pump could not deliver more than 2,400 gallons per minute.

The highest point on the curve is 114 ft. Therefore, the pump could not be used for a greater head than this, as it would deliver no water, speed remaining constant. If the discharge valve is closed entirely, the pump will merely churn its water and produce a pressure of about 111 ft. As a matter of fact, this will be a trifle higher because of the slight increase in the speed of the driving motor that takes place at "shut-off."

We can see, therefore, that the pump cannot be damaged by closing the valve in the discharge line. However, the pump should not be run for any great length of time at "shut-off," as the water will then become overheated.

It will be noticed that the head at "shut-off" is a trifle less than when 800 gallons p. m. is being delivered. This is explained by the fact that as soon as water actually begins to flow through the pump, a greater pressure is generated owing to the transformed velocity energy which, of course, was not present while no flow took place through the pump.

This slight rise in the head curve from zero gallons p. m. to 800 gallons p. m. is the proof of an efficient pump. It indicates that not only the impeller, but the volute waterway of the casing have been scientifically designed and proper conversion of kinetic energy provided for.

From an inspection of the Head Curve, it is also possible to ascertain what effect will be produced upon the output by an increase or decrease of the head against which pump operates. Suppose the pump is designed and sold to deliver 1,800 gallons p. m. at 95 ft., if the head is increased to 105 ft., the capacity will decrease to about 1,480 gallons p. m. If the head is decreased to 85 ft., the capacity will increase to 2,030 gallons p. m.

The Head Curve illustrated is a very good average curve for a general service pump. In case a variable head is encountered and minimum variation in capacity is desired, it is possible to furnish an impeller having a "steep" characterstic. That is to say, the shut-off head of such an impeller might be about 130 ft., which would cause curve to slant more sharply downward from "shut-off" to "wide open," or minimum head. The steeper such a curve is made, the less variation in capacity there will be for any change of head. A vertical, or straight-up-and-down head curve, would be most desirable, of course, as that would mean unchanging capacity, but such a curve cannot be obtained in a centrifugal pump.

Note: These remarks apply only to double suction and multi-stage pumps.

Total Head in Pipe System.

The two principal factors in the "Total net Head" or the head against which the pump must operate, are the static and friction heads. Let us refer to the dotted lines marked "Static Head" and "Friction Head" on Fig. 19. The static head is always constant (80') regardless of the quantity of water forced through the piping, while the friction head depends upon the quantity that is passing and increases with the amount of water pumped. To be more explicit, the frictional resistance, or friction head, varies as the square of the capacity. If the frictional resistance is 10 ft. when pumping 500 gallons p. m. through a given pipe line, it will increase to approximately 40 ft. when 1,000 gallons p. m. are forced through, and if only 250 gallons p. m. are passed, the friction head will decrease to 2½ ft. If 750 gallons p. m. are forced through this system the friction will increase from 10 to 22½ ft. and so on.

The "Friction Head" curve is constructed by merely drawing a smooth curve through several points corresponding to the various values of the friction head when different quantities of water are flowing. These values are, of course, plotted above the static head line and indicate the "total net head" at any capacity on the "gallons per minute" scale. It should be noted that this curve is entirely independent of the pump characteristics.

Considering this pump's characteristics together with the head curve of the system, the point where the head characteristic of the pump crosses the friction head curve determines how much water will be delivered, in this case approximately 1,950 gallons per minute.

Efficiency Curve.

The efficiency curve starts at zero, rises to a maximum 73 per cent and drops again as the capacity of the pump increases or as the head decreases. If it were possible to obtain zero head the efficiency would again become zero. At "shut-off" no water is delivered; at "wide open" no head is generated. Therefore, as no useful work is performed at either of these points, the corresponding efficiencies are zero.

Note that the efficiency curve does not rise to a sharp peak but is nearly horizontal, and has a very gradual curvature. This is always a desirable characteristic, as it shows that the pump can be operated over a wide range of capacity with excellent and nearly uniform efficiency. For instance, this pump has an efficiency of 60 per cent or better for quantities of 1,000 gallons p. m. up to nearly 2,400 gallons p. m. and the efficiency is 70 per cent and higher for a range of 1,400-2,200 gallons p. m., a remarkably wide variation.

Another desirable feature of this efficiency curve is its quick rise as the capacity of the pump increases from zero to 1,000 gallons p. m. This is possible only with the type of head characteristic illustrated and above described. With a "steep" head curve, the efficiencies at low capacities would be considerably lower. Supposing that the pump under discussion was sold for a normal capacity of 2,000 gallons per minute, the efficiency at normal capacity would be 73 per cent, at three-quarters normal capacity or 1,500 gallons p. m., 71 per cent, and at half normal capacity or 1,000 gallons p. m. it would drop to about 60 per cent. This is a very creditable performance and at any increased delivery of, say, 110 per cent rated capacity or 2,200 gallons p. m., the efficiency falls off only about 2.5 per cent from maximum.

By reading the head curve together with the efficiency curve, it is possible almost at a glance to determine the head for a given capacity, or the capacity corresponding to a given head and also the pump efficiency under the conditions in question.

Brake Horse Power Curve.

The Brake h. p. curve starts from 28 h. p. and gradually increases, reaching its higher value or peak when the delivery is 2,200 gallons p. m. and then falls off slightly. The power required at 1,420 r. p. m. under all conditions is shown by this curve. Reading up from zero capacity, we find that 28 h. p. is required at the "shut-off" point. Reading up from 1,200 gallons p. m. we intersect the B. h. p. curve at a point corresponding to 51 B. h. p. and so on up to 2,300 gallons p. m., at which point 61 B. h. p. is required. If the head is reduced so that a greater capacity is delivered the B. h. p. will decrease. This is what is called the "Non-overload" type of power characteristic. It is impossible for the pump to consume more than 61 B. h. p. under any condition as

(Continued on Page 355.)

GOOD WORK BRINGS ITS REWARD

EDITOR'S NOTE:—By using one of these Editorials each week in your newspaper advertising you will help to educate your community in the true facts of plumbing and heating merchandising. Such education will create good will and build your business. The more the public knows the better your service will be appreciated. Take one Editorial a week and reprint it in the upper left corner of your regular advertising space. Have it set in bold-faced type, with rule or border around it, as indicated on this page. This will cause the Editorial to stand out and make it easy to read. The use of these Editorials from week to week will not add a dollar to your advertising expense, but they will help along sales.

THE Advertising Editorial for this week was written at the suggestion of Edward J. Geyer. And, in a manner of speaking, thereby hangs a tale. Whatever else this tale may prove, it proves that all good work is rewarded by opportunities to do other good work. But let us tell the tale.

Edward J. Geyer is a plumbing and heating dealer at Bergenfield, New Jersey. Besides Mr. Geyer, eight thousand other folk live in Bergenfield. This fact is mentioned that everybody may know that Bergenfield is more than a name. It is a place.

Mr. Geyer has used every Advertising Editorial that has been printed. And he promises to use every one that may be printed. He uses one Editorial each week in the local newspapers in a space five inches long and two columns wide. The Editorial is centered, with nearly an inch of white space all around. At the bottom is his name, address and "Sanitary and Heating Engineer," while in each of the four corners are words in black type such as "O-E," "Arco," "Belknap" and "Humphrey."

Mr. Geyer says he never realized until recently how many people were reading the Editorials. By keeping at it every week for thirty odd weeks he has made a deep impression. Keeping at anything makes an impression. It is the only way to make an impression that will last. Now men and women stop Mr. Geyer on the street, drop into his store, and even write him letters to tell what they think of the Editorials.

Making an Impression.

Occasionally one of the letter writers seems to think that an Editorial is aimed directly at him, or, to be truthful, is aimed at her. For instance, "Garbage and Honeysuckle," back in "Domestic Engineering" for June 24th, had this effect. A lady wrote that she would use perfume if she liked and "no one can stop me," or words of similar meaning. Mr. Geyer smiled and shouted "Hooray!" He was getting on. He was making an impression, for people never go to the trouble to write unless they are impressed.

But the tale is the thing. The pastor of one of Bergenfield's churches called to pay his respects, and would Mr. Geyer "be so kind as to address the young men of my church on the subject of cleanliness some evening in the near future?"

Mr. Geyer was surprised, of course. Surprised? Well, yes, naturally—who wouldn't be? Advertisements seldom bring invitations to address church congregations.

The pastor went on to say: "I have been thinking of your advertisements as Natatorials, because they deal more or less with the bath." Natatorials. Rather clever, don't you think? "I want to congratulate you on being so progressive," continued the pastor. "When I get the newspaper I look for your advertisement the first thing. If you should discontinue them I would feel their loss very much. Reading these advertisements week after week suggested to me what a fine thing it would be to have you talk to my young men."

Surely, good work well done brings its reward. Good work is always rewarded.

Educating a Community.

Mr. Geyer says the invitation to speak is only one of many illustrations of the wonderful help the Editorials have been to him and his business. The Editorials have been the means of adding a number of good, live customers. "Through these advertisements," concludes Mr. Geyer, "more people have become acquainted with me and my work than through anything else I have ever done. Hammering away week after week is educating the public to understand the things I used to think it already understood, or else didn't want to understand. I have discovered that every community would like to know everything there is to know about plumbing and heating if only the plumbing and heating dealers will tell it."

Isn't it natural that communities should want to know about plumbing and heating? It would seem so. For what is closer to life than health, comfort and happiness? And aren't health, comfort and happiness the real meanings of plumbing and heating? But communities will never know until they are told.

And that is the tale of the Advertising Editorials in Bergenfield, New Jersey. There is only one thing the matter with this tale. It lacks a proper ending. That ending will come when Mr. Geyer tells us what he told the young men of the church on the evening he addressed them.

A Series—No. 38.

"THE WORLD DO MOVE."

THE only permanent thing is change. Everything changes from something to something else. The world, including all that's in it, is ever on the move. Thus the surgeon was once the barber. In fact the present-day barber pole is a relic of surgery. The red stripes represent the blood and the white stripes represent the bandages.

The veterinary is an outgrowth of the old horse doctor; the chiropodist worked his way up from corn specialist; the merchant changed from peddler, and the first great banker started as a pawnbroker.

So, too, the plumber has changed. He is no longer just a pipe fitter. He has grown with the growth of the science of sanitation. Today he is a sanitary and heating engineer. He must be. If he is not, he is not long a plumbing and heating dealer. For sanitation, heating and ventilation are as scientific as medicine, or surgery, or finance, or any of the other things which keep the world moving in the way it should move.

In the beginning everything was something else. It is not what was but what is that counts.

QUESTIONS & ANSWERS

This department is a clearing house for ideas and is open to every reader of "Domestic Engineering." Problems sent in are replied to at the earliest possible moment by "Domestic Engineering," and this department can be made more valuable if readers themselves will help the man who needs assistance. Read the questions and answers. If you have had similar problems, or know from experience how the faults can be remedied, do not hesitate to send in your comment or criticism. It will be some satisfaction to you to know that you have helped a fellow craftsman and a pleasure for us to pass on the data. "Every man owes some of his time to the upbuilding of the profession to which he belongs."

FREAK PIPING CONNECTIONS BURST TANK HEATER.

Editor, "Domestic Engineering":—The accompanying sketch shows a domestic hot water circulating system as installed in a residence in this town. I would like to have your opinion as to its practicability.

I was told by the contractors who had the installation in hand that upon the completion of the job the plumber

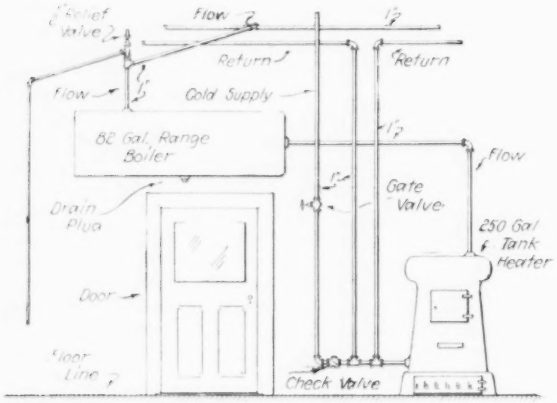


Fig. 1.

omitted to place a relief valve on the system with the result that the range boiler burst. A few days ago one whole side of the tank heater blew out, disarranging the piping in general and tearing the door casing completely away from its fastening. My opinion is that, in the first place, the tank heater is of too large a capacity. We are troubled here with a great deal of lime in the water. This I believe caused a stoppage in the heater, undoubtedly near the top. The check valve prevented the unusual expansion from finding relief through the cold water line back to the main, and the relief valve failed to work. This was entirely covered over with a lime coating, as if it had at some time been leaking.

Don't you think that the usual piping layout of connecting a return line from the 1-inch drain plug to bottom of heater, and a horizontal swing check on a 45-degree angle on both of the circulating returns, would make a better job of it? There would, of course, be no checks or valves on flow and return from heater to boiler.

Even though the hot water may back up in the cold water supply, I believe the check valve should be removed, as it has directly caused the trouble in both cases. Taking the cold water connection for the hot water system further back on the house line, I believe, will remove to a great extent the danger of the hot water backing up too far in the cold water house line.

I would introduce the cold water supply in a tee near the bottom of the range boiler. Of course, there is danger of siphonage in doing this, but the boiler happens to be tapped very peculiarly. In making repairs the siphonage may be broken by opening a hot water faucet on the first floor. What is your opinion? W. A.

Kansas.

We do not consider the arrangement as very practical. In fact, we consider it to be more of a freak than a good common sense job.

The fact that the plumber placed a check valve on the cold supply pipe and did not place a pressure relief valve on the boiler or heater is evidence supreme that he does not thoroughly understand the business. We think it is safe to say that every tank and heater installation that is hermetically sealed by a check valve as is this one, has burst either the tank or heater. Usually they just burst and leak. But in this case you have an additional danger present which would cause the heater to explode, as it evidently has done. That danger is the liming of the piping

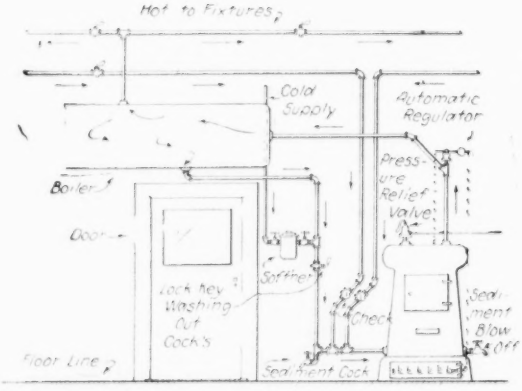


Fig. 2.

and a rather large heater for the tank capacity. The way the tank is piped up, without a return line, reduces its capacity to 41 gallons—just one-half. Only the upper half of the boiler can heat. The lower half is dead and cold, or nearly so.

There are several improvements that may be made here and we venture to illustrate them in Fig. 2.

By connecting a return to bottom of boiler we exactly double up the capacity.

By installing a water softener on the cold supply pipe, we neutralize the lime and cause it to be precipitated at bottom of tank heater in such a form that it may be washed out instead of caking in the heater and hot water piping. By installing a pressure relief valve on the boiler direct, we place it where it may be "touched off" by hand at times to see that it is O. K.

By removing the check valve on cold supply we eliminate danger of explosion from that source.

By placing check valves on return lines, we prevent cold water from backing up through returns to the fixtures.

By attaching the sediment blowoffs, we make it possible for owner to clean out the deposits as they may accumulate.

And by a washing-out cock where shown we make it possible to have a full force of water rushing down through heater to wash it out, when this cock is closed and the sediment valves are opened.

As the heater appears too powerful, and may produce steam if not carefully attended to, we install an automatic damper regulator and set it to work at, say, 180 degrees. This will dampen down the heater and prevent steaming. It will also hold up a nice steady boiler temperature and is a very essential accessory to this job.

REMEDY FOR POUNDING AT HOT WATER WARMING TABLE IN RESTAURANT.

Editor, "Domestic Engineering":—I am writing for some information about heating a steam table used in a restaurant for keeping dishes warm. The way it is now connected, (see Fig. 1), there is a great deal of hammering and knocking. This is caused, I think, by the stove and table being almost on a level, with the table a trifle lower. The coil is a 1-inch pipe, and is reamed to ½-inch at the table. This table is open on top. I wish to know if there is any way we could put in an expansion tank and if that would help?

Idaho. B. R.

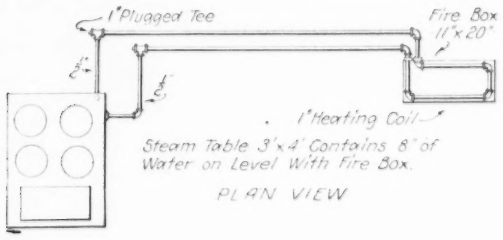


Fig. 1.

To remedy the trouble experienced it appears necessary to raise the table an inch or two—just enough to secure sufficient circulating heat to cause the water to flow faster from coil to table.

At present the circulation is too slow. The coil makes steam, and the rapid condensation of the steam when it is forced through to the steam table produces the hammer. Perhaps the irregular inrushes of cold water from table to coil, also produce water hammer. Anyhow the remedy is to increase the circulation. That can be done in two ways. One is raise the table as aforesaid. This increases the velocity of circulation. The other is to increase the size of the piping, where it is at present reduced. That increases the volume of the flow. Both will increase the temperature of the table.

We suggest that you take out the present ½-inch piping, and replace it with 1-inch. If the table is tapped ½-inch only, then, if possible, bore the holes larger and tap them 1-inch.

That's an easy job, if you find enough metal around the half inch tapping to allow this enlargement.

Having done this, put your level on the piping, particularly the flow pipe and see that it pitches up to the table. The pitch of the return pipe does not matter so much. It may pitch up either way so long as the air can get out.

You should also place the level on the coil in the firepot, and see that it is either dead level, or pitches up toward the flow pipe, preferably the latter, as this pitch in the coil will make circulation start in the right direction.

An expansion tank will not help any, the table being open, is an expansion chamber in itself.

NECESSITY OF BACK-VENT OR AIR RELIEF PIPE ON LOWER CLOSET BRANCH FROM SOIL STACK.

Editor, "Domestic Engineering":—In two-floor work, where upper floor toilet discharges past lower floor toilet, ought not the lower floor fixtures be re-vented as in sketch, Fig. 1? In order that you may understand the toilet connections, will state that this is on a back porch and yard fixtures are used.

One contracting plumber claims that in case the only fixtures on the line were the two toilets, it would not be necessary to run the revent in my sketch marked "X." He claims that the 2-inch vent from below the sanitary tee is sufficient to protect the water seal in the closet on first floor. Referring to your July 2d, 1921, issue, on page 10, I find what seems to me to be a confirmation of my claim that the revent is necessary, under all conditions of two closets on the same stack, one above the other. This plan, Fig. 1, was used and is working nicely. The other plumber does not want to follow this, or my idea on another job.

Florida. Plumbing Inspector.

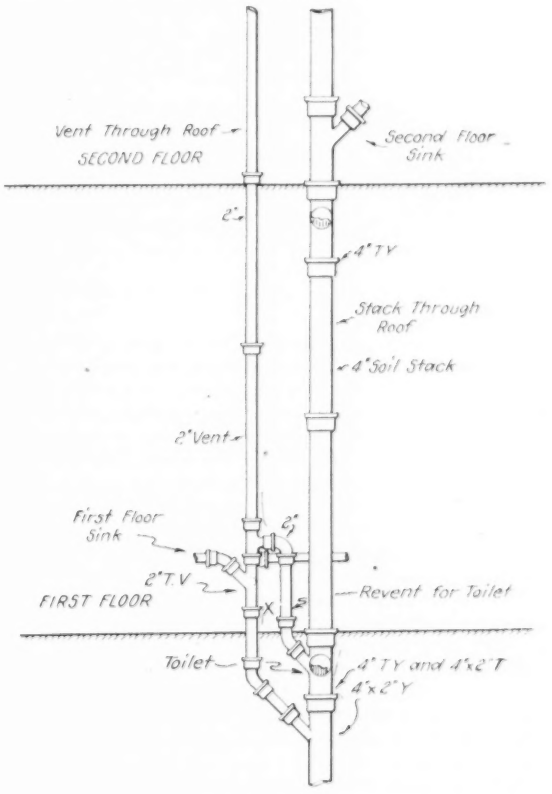


Fig. 1.

In answering this question we reproduce the sketch referred to in the July 2, 1921, issue of "Domestic Engineering," so as to make the case more clear to our readers. This sketch is shown in Fig. 2 herewith.

Studying Figs. 1 and 2, we note that the same ventilation principle is employed in both sketches. That is to say the lower closet branch in both cases is back-vented by a pipe which acts as an air relief. Sanitary authorities of repute

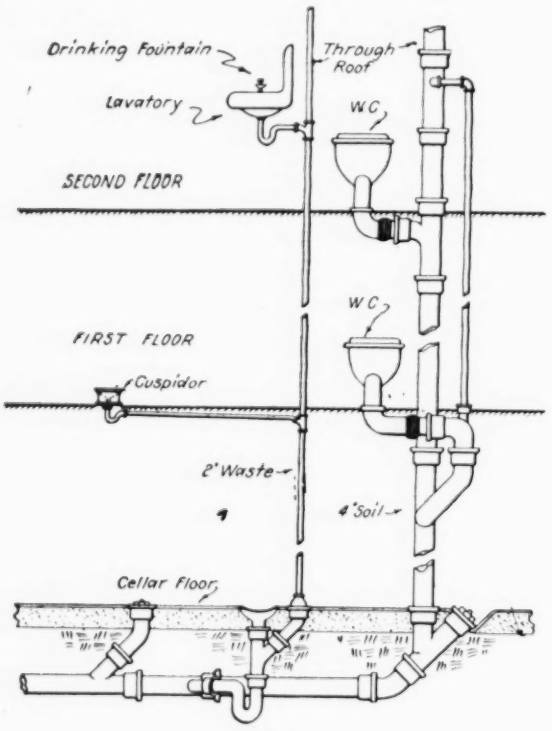


Fig. 2.

consider it necessary to have air relief pipes at or near the lowest branch to a soil stack, where other fixtures enter the stack. This is to prevent a disturbance of the trap seals at this branch. It is a well-established fact that water falling in a soil stack exerts a powerful suction on the branches entering the stack. The further the water falls, the higher becomes its velocity and consequently the greater is the suction. The air relief or back-vent pipe safely protects the trap seals against this undesirable influence.

But there is another factor at work in many cases, which produces a reverse influence on the trap seals. This also is felt to the largest extent by the lower traps. It is air compression due to obstruction of the lower drain or other passage, through which the air, which is sucked down the stack by the falling water, may escape.

In Fig. 1 the vent, A, will relieve this back pressure at the point where its 4 x 2-inch Y is located, and no doubt it helps relieve the closet branch above it, to a certain extent, but not as completely and as perfectly as the pipe X.

It is our opinion that the installation is safer and more sanitary with pipe X than without it. Your ordinance should be clear enough to define whether pipe X is called for or not. In that case you can demand pipe X; if not, the ordinance should be revised.

There were one hundred and ninety permits for plumbing issued in Kansas City, Kas., in July, Harry A. Zaman, plumbing inspector, announced. That is an increase of sixty-five over the total issued in July, 1921, but is ten less than the total for June of this year.

THE SONG OF THE BATH.

The sound of the water on my shoulders in the morning
Is like silver bells out of the blue;
The thrill of the water on my body in the morning
Gives courage great and new.
The cold of the water—the sting of it, its warmth and mirth—
From out the shiny faucet springing,
Sends all the joy of life and living, and sends it rushing
Through my body singing.

BACK BAY, Boston.

HE WAS SO IGNORANT.

He thought Mayonnaise was the name of the French national anthem.

R. S. D., Port Huron, Mich.

NOT EXPECTED TO LIVE.

One noon hour our apprentice rushed into the shop with this startling news: "Did you hear about it? Old Mr. Haskins has just had a stroke of electrolysis!"

T. N. T., Wichita, Kans.

I WONDER?

I wonder why a woman with a fur around her neck on a hot day doesn't feel the heat?

FELIX, New York.

MIXING NAMES.

"Let us stand here awhile in front of this cage of stillsons."

"What do you mean by stillsons? These animals are monkeys."

"Oh, that's right. I knew they were named after some sort of a wrench."

F. L., Cincinnati.

A FAVORITE COLLECTION HINT.

One of them said, "I will pay Saturday if I live."
He's dead.
Another said, "I will see you tomorrow."
He's blind.
Still another said, "I will pay this week or go to hell."
He's gone.

HAYSHAKER, Fall River, Mass.

People who live in glass houses should bathe in the dark.

F. W. K., Prairie du Chien, Wis.

There was a good plumber named Worth,
Who was born on the day of his birth.
He plumbed all his life,
Outlived his fourth wife,
And died on his last day on earth.

SANDY of Sandusky.

AND THEN HE LOOKED FOR ANOTHER JOB.

Plumber (to helper who is always late): "You need a self-starter to get you out in the morning."

Helper: "Not when I've got a crank like you to get me going."

MIKE QUINN, Scranton, Pa.

BETWEEN SIX AND SEVEN.

"What!" exclaimed the new arrival, "you have twenty-four boarders and only one bathroom?"

"Yes," sweetly smiled the landlady, "but you see we have a schedule. Now, for example, Miss Flashlight takes her bath between six and seven—"

"Oh, well, that's different," grinned the new arrival. "Can you fix it so that I can be one of the seven?"

A. H., Chicago.

WAS SHE A NECKING PARTY?

The other day a young lady came into my store and asked to see "an osculating fan." W. A. A., Terre Haute, Ind.

While you're on your vacation, and have nothing else to do, send in a fish yarn, or your golf score, or the name of your favorite boot-legger, or—well, anyway, let Pipe Lines hear from you.

A. W. B.

LEGAL QUESTIONNAIRE

*Are Agreements Governed by the Laws of the State in Which Made or by Those of the State in Which the Work is Done? —This Question is Answered in a Most Careful Manner**

By "The Judge"

How a Contract Is Construed Which Is Made in One State to Be Performed in Another.

Editor, "Domestic Engineering":—What are my rights under the following circumstances: I entered into a contract with a customer in my home state for the installation of some plumbing in his summer home in another state. After we had done some of the work, we had a disagreement, and he claimed that he had a right to put an end to the contract under the laws of the state where the work was being done. Are my rights under the agreement governed by the laws of my home state, where the contract was made, or by the laws of the state where the work is being done?

H. K. D.

Answer:—Except in exceptional circumstances, such as a purpose in making the contract to commit a fraud on the law, the general rule is that the courts will look into the facts and determine what law the parties intended should govern their contract or may fairly be presumed to have intended. The real place of the contract, as it is called, is decided by the mutual intention of the parties. This rule of law controls the legal obligations arising under the contract such as performance, satisfaction and discharge, as well as its execution and construction. Where the intention as to the law which is to govern the construction of the contract is not made plain in the contract itself, the courts will imply an intention from the acts and conduct of the parties at the time the agreement was made. It is possible for the parties to make the laws of any state control the contract if they have a substantial connection with the case.

There are some further general rules of construction which are called into play where the intentions of the parties are not expressed in the agreement. For instance,—where there is nothing else to show to the contrary, the act of the parties in entering into a contract at a particular place is held to show an intention that the law of that place shall control; hence, as this general rule is usually stated: "A contract, as to its validity and interpretation is governed by the law of the place where it is made, or, more accurately, that contracts are to be governed as to their nature, validity and interpretation by the law of the place where they were made, unless the contracting parties clearly appear to have had some other place in view."

On the other hand, where a contract is entered into in one state and is to be performed wholly or partly in another state, the proper law of the agreement, especially as to the mode of performance, may be presumed to be the law of the state where performance is to take place. This general rule, in the absence of other controlling facts, would seem to apply to your case, and if, as your customer claims, he has a right to end the contract under the laws of the state where the work is being performed, he would seem to have the best of the argument. Of course, unless I see your agreement or know more of the facts, I cannot state definitely whether your customer is correct in his claim that he can end the agreement.

It must be remembered, however, that the general rules above stated are not absolutely controlling, and are used by the courts simply as an aid to construction where the intention of the parties has not been clearly stated.

While in numerous cases an entire contract to be performed partly in the state where made and partly in another state, has been held to be governed by the laws of the state where made, and other courts have held that each portion of the contract is to be governed by the laws of the state where that portion is to be performed, the better rule would seem to be that the presumed intention of the parties, gathered from all the surrounding circumstances, is to be taken as controlling.

It is well to keep in mind the distinction between your rights under a contract and your rights to certain kinds of remedies for enforcement of the contract. Your right to bring a certain kind of an action in the courts, and the manner in which your rights in court are to be worked out, are always governed by the law of the place where the suit is brought. You could not go into the courts of one state and insist that the progress of your case in court and the kind of remedy which is given you should be the same as prevail in the courts of another state, your own state, for instance.

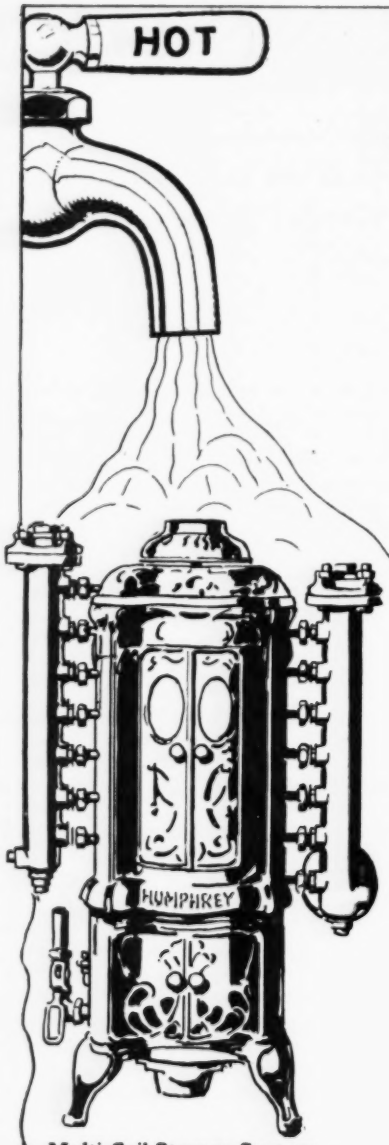
It does not necessarily follow, either, that the law of the place where the parties to the contract live shall govern the agreement. The controlling question is, where was the contract entered into or where was it to be performed, as the case may be.

What may seem, at first sight, to be an exception to the general rules stated above, is the fact that the question whether a contract has actually been entered into is almost without exception determined by the law of the place where the contract is made. Also, the capacity of the parties to enter into a contract, is generally determined by the law of the place where the agreement is entered into. However, this rule gives way to the rule requiring that contracts relating to real estate shall be controlled by the law of the place where the real estate is situated.

Whether a contract is a legal one or not is settled by the law of the place where it was made, the general rule being that a contract good where made is good everywhere and that if it is invalid where made it is invalid everywhere. It does not follow, necessarily, from this rule, that the contract which is valid where made can be enforced in every other state, for the reason that the law of some other state may be such that a remedy for the wrong done is not given by the law of the other state, and we have seen that the remedies afforded by the courts of a state cannot be changed by any agreement of the parties. For example, where a contract is entered into which violates the fixed public policy of a state,

(Continued on Page 354.)

*Every Effort is made to the End that these Answers may be authoritative. However, we cannot assume any Responsibility because of the Very Nature of the Service, which is rendered without a personal interview.—Editor.



for Every Purpose *and* Purs

THE more you reach, the more you sell—and profit you make. Sel- phrey Heaters gives YOU the long arm reach into every home in munity and with it the MULTIPLIED PROFIT that always is p the dealer who caters to ALL BUYERS—regardless of buying capacity too small! None too large!

Fully 90% of homes and business institutions within your business ra in daily need of instant, care-and-effort-free HOT WATER. All are read the moment you fit their purpose and purse. But in this 90% COM DESIRE are a multitude of demands—in size, purpose, and financial

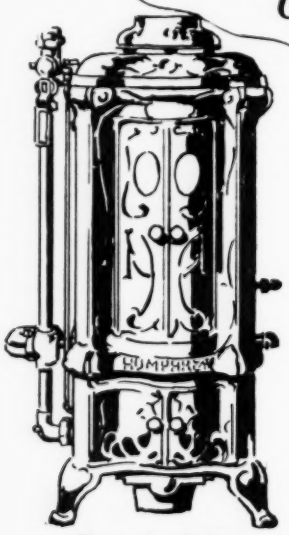
The cottage, the bungalow, residence, mansion, apartment, store, hotel, o ing, industrial plant—ALL represent a varied range of Hot Water Needs a available, which only the FULL LINE OF HUMPHREY GAS WATER H can safely, adequately and completely serve.

HUMPHREY fits the NEED—which is your key to turning your 90% buying desire into 90% SALES.

HUMPHREY
Gas Water Heaters

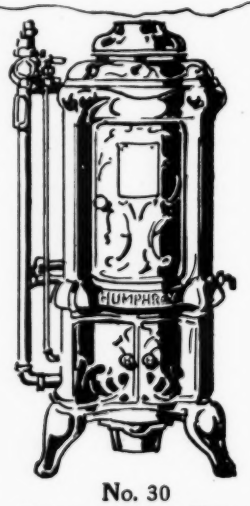
Multi-Coil Storage System

For hotels, factories, apartment buildings and other large institutions where heavy demands must be served. Entirely automatic, needs no attention. Complete system includes Heater, Boiler, Boiler Supports, Insulation and Temperature Control.



Type A—5 Sizes

The simplest, most complete, efficient, durable and economical Automatic Gas Water Heater. Attractive appearance. The accepted standard of Gas Water Heater construction that others have only attempted to reach.



No. 30
Pressure Valve Type

For cottages, bungalows, and other places of small demands. Without Thermostatic Control. Very popular type, sold everywhere to homes of more moderate needs. Capacity 3 gallons per minute. Entirely automatic.

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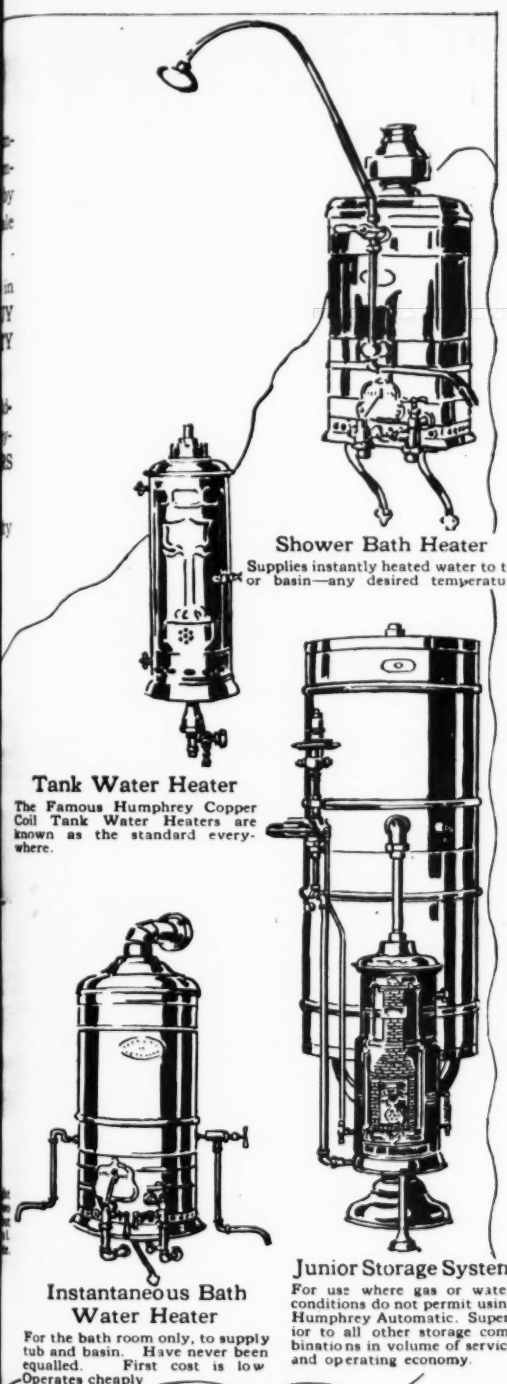
HUMPHREY 12 in 12 et



Shower Bath Heater
Supplies instantly heated water to tub or basin—any desired temperature.

Tank Water Heater
The Famous Humphrey Copper Coil Tank Water Heaters are known as the standard everywhere.

Instantaneous Bath Water Heater
For the bath room only, to supply tub and basin. Have never been equalled. First cost is low Operates cheaply

Junior Storage System
For use where gas or water conditions do not permit using Humphrey Automatic. Superior to all other storage combinations in volume of service and operating economy.

12 IN 12
BETTER BUSINESS PLAN

Where Are YOU Heading For?

YOUR experience in life has undoubtedly proven to you that the most successful way to accomplish any business undertaking is to set a GOAL. Then to keep working persistently toward that GOAL with a definitely planned METHOD OF ACTION.

You're in business to make money—and the bigger, the better. The surest way to make big money is big sales, in volume and unit—with a big aim directing these sales.

Your big aim for 1922 of MULTIPLIED SALES and the METHOD of seeing it successfully accomplished is the basic idea of "12 in 12" Better Business Plan.

Incidental to the GENERAL SALES INCREASE that you can expect and the public confidence you win, the "12 in 12" Plan sets your sales quota of 12 Humphrey Automatic Water Heater Sales within the 12 months of 1922 and thus you earn the MAXIMUM PROFIT plus the GREATER TURNOVER PROFIT. All three objectives are combined successfully in the one single "12 in 12" Plan.

If you already have averaged 12 Humphrey Automatic Sales in one year, you set your quota correspondingly higher. It is to be reasonably expected that in some cases the quota may not be reached in one single year. Perhaps not until 1923, 1924, or even 1925, depending upon local conditions and the dealer.

By your adhering to the "12 in 12" Plan as a year-after-year policy, and as one which the Humphrey Company are going to back you for years to come—you can reasonably reach YOUR QUOTA OF SALES INCREASE in a fraction of the time ordinarily required.

No time, energy or brain effort is required. Humphrey do all the work for you. You simply send us your list of Water Heater prospects.

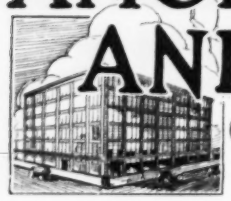
Write today for this remarkable Business Plan. Your copy is FREE. Get this Plan which hundreds of dealers are now using successfully—the Plan which has revealed a new way to your profit making.

HUMPHREY COMPANY
Merchandising Bureau, KALAMAZOO, MICH.

etter Business PLAN

hen writing advertisers.

AMONG THE WHOLESALERS AND MANUFACTURERS



COMPANIES RECENTLY INCORPORATED.

The Boiler Specialties Co., of Clinton, Mass., has been incorporated with a capital of $100,000, to manufacture heating specialties. The incorporators are: Charles C. Sanderson, Adin W. Constance, Allan G. Buttrick, George E. O'Toole and Ora L. Stone, all of Clinton, Mass.; John H. Coughlin, of Sterling, Mass., and Edward L. Hare, of Worcester, Mass.

William E. Bent, Inc., of Springfield, Mass., has been incorporated with a capital of $25,000, to manufacture heating specialties. The incorporators are: William E. Bent and B. A. Bent, both of Longmeadow, Mass., and J. Wesley Shaw, Jr., of Springfield, Mass.

The Penetrator Co., Inc., 215 Fourth Street, Lakewood, N. J., has just been incorporated with a capital of $2,000, to manufacture a rust-removing liquid. The officers of the new company are: John A. Myers, president and treasurer; and Jas. J. Myers, secretary.

The Craigulator Service Corporation has just been incorporated under the state of Rhode Island, with a capital of $25,000, to deal in heating equipment. The incorporators are: William J. Houle, 27 Nickerson Street, Pawtucket, R. I.; James W. Craig and E. Wellman Craig, both of Pawtucket, R. I.

PREPARING PLANS FOR REBUILDING.

The National Sanitary Co., of Salem, O., is having plans prepared for rebuilding that part of its factory which was recently damaged by fire.

NEW FOUNDRY NEARING COMPLETION.

Thomas Savill's Sons, of 1310-1314 Wallace Street, Philadelphia, have nearly completed the construction of a new foundry and core room, which will greatly increase this firm's capacity.

HARTMAN INGOT METAL CO. EXPANDING.

The Hartman Ingot Metal Co., of Chicago, is installing twelve additional coke furnaces in an endeavor to keep pace with the demand for its products. As this company's sales are confined almost entirely to manufacturers of plumbers' brass goods, the increasing demand for raw material would indicate an increasing demand for brass goods on the part of plumbers and jobbers.

FRED H. ROUNDS CALLED BY DEATH.

Fred H. Rounds, president and founder of the Fred H. Rounds Supply Co., of Portland, Me., one of the largest plumbing supply houses in Maine, died suddenly at his home in that city on Thursday, August 10th, in his 64th year. He underwent a serious operation about a year ago which weakened his heart, resulting in death. His death was a shock to his friends, who had believed him to be in fairly robust health. Mr. Rounds was born in Baldwin, Me., was educated in the public schools, graduated from Westbrook Seminary in 1880 and later from a business college in Poughkeepsie, N. Y. He then became accountant with a Boston firm. After a few years he became a travelling salesman for Haines, Jones & Cadbury Co., of Philadelphia, a position he left to become associated with Henry C. Weeden, of Boston. From there, 12 years ago, he went to Portland, Me., with C. M. and H. T. Plummer, and upon the death of Charles M. Plummer he founded the Fred H. Rounds Supply Co., in which he had been eminently successful. He resided for some years in Malden, Mass., later removing to Melrose, Mass., where he served as a member of the Board of Health for some time and as president of the Melrose Athletic Club. After removing to Maine he joined several organizations there. He was a 32nd degree Mason, member of Portland lodge of Elks, Portland Chamber of Commerce, Portland Rotary club, treasurer of the Davy Crockett club and a member of many other organizations in that city. His funeral was held Sunday, August 13th. Among the floral tributes were gifts from the Portland and the Maine Master Plumbers' Associations. A son and a daughter survive him.

ERECTING LARGE WAREHOUSE BUILDING.

The New Bedford Boiler & Machine Co., of New Bedford, Mass., is erecting a warehouse at the corner of Commercial and Water Streets, in that city. The new building will be of reinforced concrete, three stories and basement, 167x60 ft. On the first floor space will be reserved for offices and showroom, the latter to be 60x40 ft.

DELAWARE VALLEY TRADE GOLFERS ON MERION CRICKET CLUB COURSE.

The regular monthly tournament of the Delaware Valley Trade Golf Association was held on the course of the Merion Cricket Club on Wednesday, August 9, with a smaller attendance than usual, owing to the fact that many members were on their vacation. Thirteen members were present and enjoyed a fine day's golf.

In the morning every one present went out to get the best medal score and win the prize. Ray Bolsinger proved the winner with a score of 97-20-77.

At noontime the golfers enjoyed an excellent luncheon at the club house.

After lunch the players paired off and played for the best ball foursome prizes, the result being that Ray Bolsinger and W. G. Culbert won the first prize with a score of 80-19-61, while R. G. Savill and Chris. Webber won the second prize with a score of 95-30-65.

Supper was thereupon served, at which it was announced that the association had been invited by Wilson Carey and Wm. McPhail to hold its September meeting at the Baltimore Country Club. This is expected to be the largest tournament of the season, as most of the members will have returned from their vacation by that time and be ready to lift the pill.

The scorekeeper's records of the day's events follow herewith:

Morning Medal Play.

Bolsinger	77	Kerr	86
Culbert	94	Taylor	95
Newton	95	Allen	90
Fogwell	86	Savill	95
Groff	94	Webber	82

AFTERNOON BEST BALL FOURSOME.

Bolsinger and Culbert	61	Newton and Taylor	67
Kerr and Kleinman	77	Savill and Webber	65
Groff and Fogwell	68	Barcus	69
Deacon and Allen	72		

PERSONAL MENTION.

Chas. F. Hause, president of the Chas. F. Hause Mfg. Co., Inc., of Omaha, Nebr., has just returned from a visit to his company's branch in San Francisco and reports that the commercial clubs in Northern California have a new movement under way to stimulate building in that section of the state.

Thomas J. Callan, of Peck Bros. & Co., New Haven, Conn., is at present on a trip to the jobbing centers in the West.

John Gibson, of Detroit, Mich., has been appointed representative for Thomas Savill's Sons, of Philadelphia, to cover Ohio, Indiana and Michigan.

B. C. Cooke, formerly president of the Globe Shipbuilding Co., Superior, Wis., has recently joined the Holt Power Light Co., of Detroit, Mich., as vice-president and general manager.

J. M. Warner has recently joined the sales force of the Chas. F. Hause Mfg. Co., Inc., of Omaha, Nebr. He will cover Colorado and Wyoming and will make his headquarters in Denver.

E. S. Thompson, Philadelphia representative for the Ever Hot Heater Co., of Detroit, Mich., has moved his office from the Builders' Exchange to Guaranty Industrial Building, Twenty-fourth and Chestnut Streets, Philadelphia.

Sam. W. Goldman, one of the founders of the Josam Manufacturing Co., of Michigan City, Ind., announces that he is retiring from this business and has sold his interest to R. C. Koblitz, of Cleveland, O. In announcing his retirement he calls attention to the fact that the "Sam" in "Josam" is his first name.

Howard E. Krum, Jr., manufacturers' agent, Chicago, has just returned from an extensive motor tour of the East and New England. While in New Britain, Conn., Mr. Krum visited the works of the A. J. Beaton Mfg. Co., and in passing through Detroit stopped at the home office of the Acme Brass Works. Mrs. Krum accompanied him on the trip.

* * *

James Griggs, treasurer of the Bergh-Griggs Co., of Tacoma, Wash., is one of the newly appointed members of the Board of Directors of the National Association of Master Plumbers, and not Wm. Griggs, as it was erroneously reported in last week's issue.

The Business Home of the Montgomery Plumbing Supply Co., which was recently Opened at 437-445 Montgomery Street, Jersey City, N. J.

NEW BUSINESS VENTURES.

The Elmgren Engineering Co., of Hartford, Conn., has been incorporated with a capital of $50,000, to conduct a plumbing and heating business. The incorporators are Clarence J. Elmgren, Elmer G. Elmgren and Gustav V. Berglund.

James T. Kelly has opened a plumbing business at Wilkins Avenue and Orchard Street, Port Chester, N. Y.

W. Irvin has opened a plumbing establishment at Corning, Iowa.

W. C. Fisher has opened a plumbing and heating establishment at Saco, Mont.

A. A. Williams has opened a plumbing and heating business at 719 Cambridge Street, Kewanee, Ill.

City Plumbing Co. is the name of a new business at 645 Main Street, Osawatomie, Kans.

Twenty Years Ago in "Domestic Engineering"

Saturday, August 16, 1902.

Model Bathroom.—The Standard Sanitary Mfg. Co. will have on exhibition at the Pittsburgh Exposition, which opens early in September, a bathroom in which not the slightest detail will be overlooked.

An Interesting Contract.—The Philip Carey Manufacturing Company, Lockland, Ohio, has just closed one of the largest contracts closed by any pipe covering manufacturer in recent years. After several months of scientific tests of various materials, this company was awarded the contract to furnish its 85 per cent carbonate of magnesia covering to the power station of the Manhattan Railway Company, 74th and East River Streets, New York City. Total cost about $25,000.

In New Quarters.—The Clayton & Lambert Manufacturing Co., of Detroit, has moved into its new home at the corner of Beanbrier and Frombley Streets.

Builders to Organize.—The master builders of Connecticut are forming a state organization for protective and cooperative purposes. During the past few months the building trades in Connecticut have been greatly embarrassed by strikes, and the new organization will adopt measures of defense and establish a uniform scale of wages throughout the state.

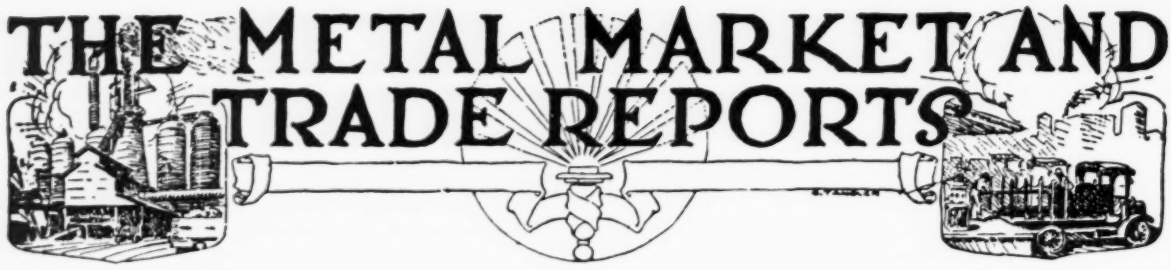
Great Public Loss.—The City of Chicago, it is said, will try to collect damages from the street car companies for injuries to water pipes caused by electrolysis. Electric currents escape from the surface and elevated rails and enter water pipes, eating away portions of the pipes. It is estimated that this damage amounts to $1,500,000 annually.

Progress.—Fifty years ago a skilled mechanic earned from $1.25 to $1.75 per day, and the day's work usually lasted from sunrise to sunset. Today the same class of workmen earns from $3 to $4.50 a day, and begins and ends his work at a fixed time, which is usually within the limits of eight or nine hours.

A Live Firm.—Walls & Pearsall, Philadelphia jobbers, are erecting a handsome new building to house their business at the corner of Eleventh and Hamilton Streets and Ridge Avenue.

Eastern Trade Golf Association.—The germ of an idea suggested by "Domestic Engineering," which resulted last fall in the establishment of the Trade Golf Association in the west, has taken new root in a similar and affiliated association among the members of the supply trade in the east. Because of the organization of the Eastern Association the name of the older organization has been changed to the Western Trade Golf Association.

THE METAL MARKET AND TRADE REPORTS



Steel and Iron.

Steel companies in the Pittsburgh, Wheeling and Youngstown districts, harried by the two strikes and forced to abandon selling, are turning their attention to the question of prices. While their furnaces are being banked for want of fuel and their rolling schedules curtailed in consequence, and while the buyers stand frantically at the doors and knock to have them opened, or run from mill to mill in hope that some crumbs will fall beneath the table, the sales managers sit and study the economic situation, foreseeing increases which will come and which are expected to stay. The signs of them are already seen in new price levels somewhat higher than last week.

That these prices are brought about by the operating situation there is no doubt, but the sales departments argue that after the fuel emergency is over these prices will not drop, but will remain steadfast for a long time to come, or possibly go higher.

The higher cost of coal is adding at least $15 a ton to the production cost of highly finished products. While steel prices are tending upward, the advances have not been sufficient to cover this differential in coal costs, and it is pointed out that coal is not now available for the steel industry, and it would be impossible for makers to pay prevailing prices without further marking up steel prices.

Some little coal is coming through daily, but much of it is of indifferent quality. One large interest, ordinarily using 135 cars daily, reports receipts of thirty-five carloads one day last week and eleven another. The market on bars, shapes and plates is up with 1.80 cents a minimum. The Jones & Laughlin Company notified customers last week that its price is advanced to 2.00 cents. This is interpreted as a move to discourage customers from buying because of the scarcity of coal. Small lots for prompt shipment are selling easily at a premium of $2 a ton, and the market is quotable at 1.80 cents to 1.90 cents.

A special price of 2.75 cents is now the rule on hoops under one inch in width.

Some mills report demand for oil country goods as very materially decreased in the last two or three weeks, while others state that they have observed no change. Pipe mill operators in the valleys have been decreasing in the past two weeks. The leading interest maintains the production rate of a month ago, but may not be able to continue much longer unless the coal situation suddenly loosens up. Prices on tubular goods are firm on the basis of the published lists. So far as reported, none of the mills is securing delivery premiums.

The feature of the tin plate situation is the anxiety of the packers to get more cans. The Canners' Association, with abundant crops ahead, has been working on a project to send a committee to Washington to make representations to the Government as to the propriety of giving coal priority to the manufacture of cans and tin plate for cans. The tin plate mills are under pressure. The limiting factors are coal, steel and labor supplies. Coal is being trucked from an idle plant to an active one. The independent tin plate mills are producing at a rate close to 80 per cent of capacity on the basis of actual tonnage output; the American Sheet and Tin Plate Company is doing 70 per cent. The company's plant at Gary, Ind., has been down for more than a week on coal account. There is a great deal on track consigned to the plant, but it does not move.

Production of sheets last week was probably at less than two-thirds of capacity.

Soon after the coal strike started, one authority predicted $30 iron before the strike was over, and considerable publicity was given to the prediction. The market price of iron at the beginning of the strike was $20. The prediction has at last come true, but it took the railroad strike to help to bring it about; otherwise pig iron would today be selling at $5 per ton less. The prediction was based on the coal strike alone and for that reason has not been completely fulfilled.

Were there an active demand for pig iron there would be a runaway market such as took place during the war when the Government finally stepped in and set maximum prices. Present supply and demand are being regulated automatically.

Eastern blast furnaces have had less trouble with shipping iron than those in the Middle West, where embargoes, lack of open top cars and congestion have interfered more seriously. More furnaces have banked in the West than in the East.

Up to date about 70,000 tons of foreign iron has been sold in this country this year. Prices for pig iron are quoted as follows:

No. 2 foundry, Pittsburgh	$30.76
No. 2X Eastern Pa., Philadelphia	31.14
No. 2 Southern, Birmingham	19.00@20.00
No. 2 foundry, Chicago, furnace	27.00@28.00
Basic valley, furnace	26.00
Bessemer, Pittsburgh	28.76

Copper.

Last week was moderately good in copper and prices were unchanged at 14 cents for delivered electrolytic. Though two producers are naming 14⅛ cents, it is equivalent to an announcement that they are out of the market. One sale was made at that high figure, but lack of additional sales has failed to establish the market at higher than 14 cents.

Brass and copper products are firm. Demand for brass rods and brazed tubing has fallen off. The reason for the falling off in the call for brazed tubes is the substitution of electricity for gas in private houses. Sales have decreased at the rate of 18,000,00 to 20,000,000 pounds a year. Some makers of brass products have taken their salesmen off the road until they can get caught up with orders. Manufacturers are threatened with shutdowns due to fuel shortages. The releasing of workmen due to shutdowns would be harmful as employes would go to other districts and industries, and when manufacturers resumed operations there would be labor shortages.

On the New York Metal Exchange at the end of the week electrolytic was unchanged at 13¾ cents, spot to October, against 13⅞ cents asked. Standard copper was 5 points lower in settling price at 13½ cents asked and 13¼ cents settling price, spot to October.

Tin.

The past week in tin was unsatisfactory, principally due to the delay in receipts of cabled prices from Great Britain. The crisis was reached on Thursday when no cables arrived. A steady improvement took place at the close of the week.

The trade comments that a handful of Irish did more damage to cable service than did the entire German nation during the war. At the close of the week the 32 cents level was again reached. Sterling exchange gained 1 cent during the week. Neither sellers nor buyers seem anxious to transact business. Prices have declined nearly 1 cent in the past ten days, therefore sellers felt they should wait an upturn of the market. Buyers do not need tin and will watch the outcome of the strikes before covering future needs.

Lead.

Lead prices at the close of the week had advanced to 5.90 cents New York and 5.55 cents East St. Louis, the New York quotation being 15 points higher than that of the American Smelting and Refining Company. The strikes have not had such an ill effect on lead as upon the other metals. Chief demand comes from white lead interests. Activity is also being shown by ammunition, cable and battery makers. Desilverized lead is obtainable at the same price as common lead.

Zinc.

The depression in the steel industry has carried down zinc with it as the two metals are closely allied. Prices have yielded 10 points, the metal now being obtainable at 6.20 cents East St. Louis. Galvanizers have ceased buying because of their curtailments due to fuel shortages. High grade zinc has been in excellent demand by the brass mills and has sold at 7.25 cents per lb., with 30 cents per 100 lb freight allowance.

Other Metals.

Quotations on other metals in New York are as follows:
Aluminum in 15-ton lots, 99 and purer....20.00 cents per lb.
Antimony, Chinese brands ..... 5.25 cents per lb.

New York Old Metal Market.

The following prices are current for old metals:

	Buying	Selling
Copper, heavy	11½ to 11¾ cents	12¼ cents
Copper, light	9¾ to 10¼ cents	10¾ cents
Brass, heavy	6¼ to 6¾ cents	7¼ cents
Lead, heavy	4¾ to 4⅞ cents	5⅛ cents
Tea lead	3⅝ to 3⅞ cents	4⅛ cents
Crucible copper	11⅞ to 12⅛ cents	12½ cents
Zinc, new scrap	4½ to 4¾ cents	5¼ cents

Chicago Old Metal Market.

The following are the current prices for old metals:

	Buying	Selling
Crucible copper	11¼ to 11½ cents	12 cents
Heavy copper and wire	11 to 11¼ cents	11½ cents
Light copper	8½ to 9 cents	9½ cents
Red brass	8¼ to 8½ cents	8¾ cents
New brass clippings	8 to 8¼ cents	8¾ cents
Heavy yellow brass	6½ to 7 cents	7½ cents
Light brass	5 to 5½ cents	6 cents
Heavy lead	4¼ to 4¾ cents	5 cents
Tea lead	3½ to 3¾ cents	4 cents
Zinc	3½ to 4 cents	4½ cents
Block tin pipe	26 to 28 cents	29 cents

IN THE NEW YORK SUPPLY MARKET.

New York, N. Y., August 14th.—The feature of the week in the New York plumbing and heating supply market is undoubtedly the further move upward of five points in soil pipe prices. While the advance is not yet general, it is considered probable that the mills which at present are marking time will adopt the new price schedules in the near future. Jobbers in the Greater New York area have lately been frank in predicting that any move in this commodity would be down rather than up and they are making no attempt to hide their astonishment. Steel pipe also has been advanced by one or two of the mills, but this announcement has been well discounted in advance.

Jobbers claim that the only reason for the move in soil pipe is the continued heavy demand and the shortage of stocks. The claim of the manufacturers is that their expenses of production and distribution are still increasing and the former price levels gave them too small a margin of profit. In the meantime the arrears of orders have not yet been covered, although the position is improved in that respect, and the railroad strike has added another burden to the problem of shipment.

While the advance in steel pipe is limited to a very few firms, it is noteworthy that these are about the only houses which are in the market for business, the others being over-sold on orders and devoting their attention to catching up arrears rather than going after new business. The advance of five points is accepted by the market as inevitable and has not taken any one by surprise. Demand for this commodity continues active in line with the class of building construction under way, and the falling-off incidental to the season is much less marked than that which is generally experienced in normal years.

Iron pipe is steady, and houses handling wrought iron pipe are picking up a little business here and a little there. The arrears of house construction, calling for wrought iron pipe, must now be considerable, and jobbers in all lines of higher grade plumbing and heating supplies are hopeful about this factor in the situation. The only trouble is that it may be deferred quite some time yet; almost certainly until next spring.

Enameled ware is in fair demand, considering the time of the year, the mid-summer slump being much more evident in normal years than is the case this year. Plumbers are beginning to show the mid-summer tendency to liquidate their stock to the lowest possible level before buying further, and jobbers are treating the manufacturers accordingly. The situation in this respect is likely to become worse steadily as the summer passes, reviving in the fall, of course: at any rate, it is hoped so.

Brass goods are following the same course as enameled ware. Prices in both cases are steady, with no movement either way anticipated in the near future. One or two houses have made slight advances in some lines, but these are merely cases where the last advances generally adopted by the trade were not taken up.

Steam heating equipment continues dull, with practically no repair work and not much new construction. Jobbers profess themselves as being satisfied with the situation in this respect, saying it is quite normal for the season of the year.

"The advance of five points in soil pipe was more or less unexpected," said H. W. Letcher, manufacturers' agent. "I guess it was justified by factors in the cost of production because in these days of extended publicity to every move made by any one concerned, it isn't likely that the mill men would try to get away with something that they couldn't justify to their customers. The advance in steel pipe hasn't caused much surprise among the trade. The point is that it is noticed only by a few houses but those are the ones which are in the market for orders. Most of the mills are oversold. Business on the whole is good, some jobbers having more business than they can comfortably handle."

"There isn't much change to report," said Elmer Doolittle, of the Central Plumbers' Supply Co. "Demand continues fairly active, particularly so for this time of the year, and prices are firm, with soil pipe making another advance. It was supposed that this commodity had reached its peak, but it evidently had just one more kick in it."

"Wrought iron pipe is about the same," said Henry Carlan, of the Reading Iron Co. "We get enough business to keep us fairly busy and we look to a decided improvement soon. More inquiries are coming along, and that we consider a good sign."

IN THE CHICAGO SUPPLY MARKET.

Chicago, Aug. 16.—The coal and rail strikes—which at the present writing remain unsettled, although indications point to an early peace in the former controversy—are seen by most observers as having a depressing effect on the Chicago market of plumbing and heating supplies. It seems apparent that even an early settlement of these industrial tie-ups will be unable to avert a rise in the prices of building materials. Manufacturers of many lines are unable to do more than hope for shipments to get through, and this has created a situation of uncertainty which is having a tendency to discourage buying for other than immediate needs already contracted for. Of course, there is a large amount of this kind of buying, and the fact that material is hard to get, is leading to a large number of inquiries on the possibility of immediate shipments. Immediate shipments, however, are not forthcoming except in very rare cases.

Soil pipe cannot be had for the reason that, effective August 16, the southern railroads have put an embargo on all material moving north and west except fuel and foodstuffs. As most of the soil pipe for the Chicago market comes from the Birmingham district, this rule practically precludes the possibility of the arrival of any more soil pipe in this city. Eastern foundries are finding a ready market for their entire output on the Eastern market, and it is not considered likely that anything in the soil pipe line will move directly west.

"The situation is critical," says Wm. B. Neal, of the Somerville Iron Works, "and we are rapidly approaching a place where our operations will be completely paralyzed by lack of raw material, and for want of cars to haul the finished product. I believe that unless something breaks soon, ten more days will see us completely closed down till the whole affair is settled."

The long anticipated advance in steel pipe has materialized in the form of a two point advance on galvanized pipe, while black pipe has gone up three points. This applies only to the independents, however, and at the present time no change has been announced by the Corporation. Speculations as to whether or not the latter interests will advance vary, but the fact that the Corporation did not follow the independent steel mills in their advance on sheets and bars, made some time ago, may justify the belief that pipe prices will remain unchanged.

Following right on the heels of the advance in steel pipe, wrought iron pipe advanced five points on all sizes and weights.

Brass goods used in connection with plumbing and heating installations are enjoying a fairly good demand, the market is steady and there appears to be no shortage in this line of material. Several of the smaller manufacturers of plumbers' brass goods and specialties have advanced their prices within the past two weeks, and one manufacturer's representative sees an advance on packless radiator valves in the near future.

The demand for sanitary enameled ware is far in excess of the supply, and, to quote a representative of the leader in this field: "The enameled ware shortage is more acute than ever, demand continues unabated, shipments are coming through slower, and the factory output is being crippled by shortage of raw materials."

Pottery is in good demand, although there is not the shortage in this line that is being experienced in enameled ware.

Jobbers interviewed see a slight easing off in the demand for plumbing goods all along the line, and as the jobbers are closest to the trade, it is likely that this will be reflected back to the manufacturers, if it continues for any length of time. Enameled ware, especially tubs, soil pipe and fittings and steel pipe are the three commodities in which the greatest shortage exists, as far as the jobbers are concerned.

IN THE PHILADELPHIA SUPPLY MARKET.

Philadelphia, Pa., August 14th.—Demand in the plumbing and heating supply market here maintains a fair level of activity with prices steady. Stocks are heavily depleted in certain lines, and continual strikes at foundries are causing anxiety in jobbing circles here. The coal strike has not yet expressed itself in terms of inconvenience to any material extent.

"The trouble with the strikers," according to one leading jobber, who did not wish to be quoted personally in this connection, "is that they are receiving too high wages. They can earn enough in a few days to keep them for the week and this has an inevitable effect on their enthusiasm for the job about Wednesday or Thursday. It is likely to have an inevitable effect on jobbers here also, as our stocks are low in such lines as soil pipe, wrought iron pipe, pottery ware and enameled ware, and we are finding increasing difficulty in effecting renewals."

Soil pipe continues in good demand. The problem is still one of getting supplies rather than of getting business. The price advance last week by one or two manufacturers is not taken seriously and is regarded rather as an attempt to see whether dealers will stand for such a move. If jobbing public opinion lines up in force against it, the advance will probably never come to anything. A leading Philadelphia jobber had not even heard of it, although it is being spoken of in New York.

Wrought iron pipe is active. The building program here is not confined to the erection of cheap apartments and small homes by speculators, as in the New York area. There is quite a large volume of high-class apartment building under way, and some fine plumbing and piping is being installed.

Steel pipe is also active, more so perhaps than is customary at this time of the year, though naturally not so good as it was earlier in the season.

Enameled ware and pottery are showing a good demand but stocks are seriously depleted in certain lines and shipments are not coming through satisfactorily. This is not charged against the railroad strike, whose effect has not yet materialized to any great extent. The trouble, as previously explained, is caused by strikes at the foundries, where enforced higher wage scales have been the chief factor in recent advances in price schedules.

The heating equipment line is fairly active, particularly for the time of the year, which is too early for fall business and is concerned mainly with new construction. Heating installations are being put in with the rest of the equipment and there is little or no tendency to defer this part of the work to the winter months. In some other cities home-builders have a habit of coming to the end of their financial resources before they come to the end of their building operations, and they postpone the heating installations in such cases until the time when they are actually required. Such cases do not represent a loss but merely deferred business.

"We find business good," said William Owen, of the Walls, Owen & Stambach Co. "There is a fair demand for most lines of supply, and prices are steady. We do not anticipate any further upward moves at present. We would like to see shipments coming along better as stocks are getting low and demand continues active."

"We are having a good volume of orders," said a representative of the Haynes Selling Co. "It is good-class business, too, apartment houses with from 275 to 1,000 radiators, which speaks for itself. The building program here altogether is on a good level, and there is some very fine material being called for."

Burens Heating & Ventilating Co., of Cleveland, O., has been incorporated with a capital of $5,000.

Exchanging Ideas is the Foundation of Progress

What Associations Are Doing

Through United Effort the Individual Succeeds

FOUR HUNDRED ATTEND NEW ORLEANS MASTER PLUMBERS' OUTING.

About four hundred members of the Master Plumbers' Association of New Orleans, La., and their wives and children, had the time of their lives at the annual picnic held at Felix Park in Kenner, near that city, August 5.

The most exciting event of the day was the married women's foot-race, which was won by Mrs. G. C. Gore. Alice Hannon won the race for girls under six, and Eugene Grimaldi for boys under six. Other prizes were won as follows: Irene Brugniens, race for girls under 15; Emile Babst, race for boys under 15; Miss Mercedes Barfield, young women's race; Louis Opperman, race for master plumbers; J. A. Davis, fat men's race; A. C. Williams, free-for-all race; John Mahner, sack race.

At New Orleans Master Plumbers' Annual Outing. Left to Right: N. J. Cosu, Miss G. W. Jackson, S. Antoine, Mrs. N. J. Cosu, Mrs. S. Antoine, Mrs. W. J. Quinlan, W. J. Quinlan. The Children Are: Elvern Arroyo, John Jackson, Nell Antoine.

W. Flanagan in the Role of a Clown at the New Orleans Master Plumbers' Outing.

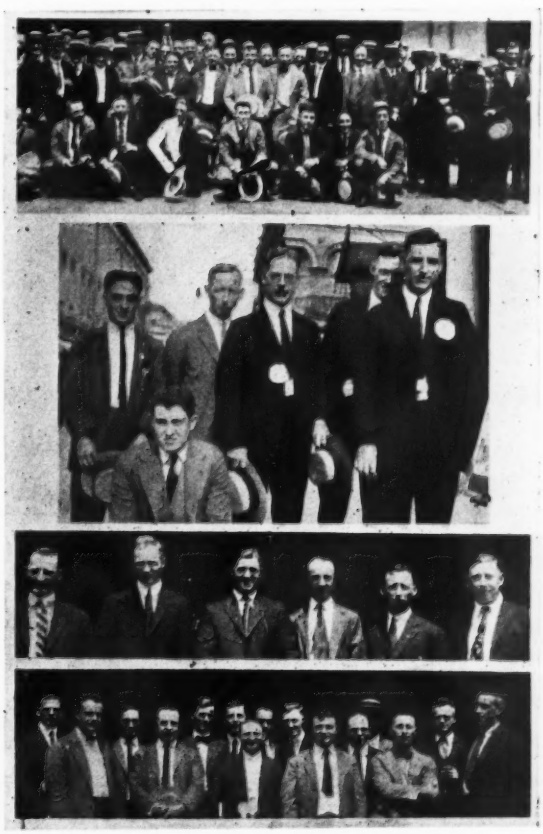
In the tug of war, the master plumbers defeated the employes.

Martin Manion, president of Manion & Company, made the speeches of presentation, and his keen wit drew forth many rounds of laughter.

The committee in charge of the outing included: J. R. Lawton, president of the association, general chairman; J. V. Stiefvater, chairman refreshment committee; L. E. Estrade, chairman reception committee; J. Reynolds, chairman floor committee; J. L. Brugniens and McCollough Smith, transportation committee.

PATERSON, N. J., PLUMBERS AND HEATERS HOLD 21ST ANNUAL OUTING.

The Master Plumbing and Heating Engineers' Mutual Protective Association, of Paterson, N. J., held its twenty-first annual outing, on Saturday, August 5th, at Stauch's Hall, Coney Island. Over 150 members, guests and salesmen made the trip to Coney Island, the scene of merry makers and pleasure seekers. Arriving at Coney, every one entrained for Stauch's Hall where an elegantly prepared luncheon was waiting for them. During luncheon Harry Walls, assisted by his able committee-men distributed combination badges entitling the members to free swing at Steeplechase Park, where the group adjourned after lunch. It was a happy



Master Plumbers and Their Friends in Attendance at the Outing of the Paterson, N. J., Association.

group after they once got started on the slides, rides, whirlpools, scenic railways and the fun makers. After three hours of continuous laughter and fun the members all congregated at Stauch's Hall and sat down to a 10 course dinner.

After the cigars were passed around Robert F. Ash announced they were ready for distribution of the many articles that were donated by the manufacturers and jobbers. He appointed John Baker and Frank Vreeland as tellers and Frank K. Chew, H. Heatherton and H. J. Carr as judges.

The awards in detail were as follows: Samuel Bulmer received a gas range donated by Wm. H. Gurney. J. A. Faber, a set of Toledo stocks and dies donated by Central Plumbing Supply Co. John T. McBride, $25 worth of specialties from J. A. Sexauer & Co. James W. Taylor received a pedestal lavatory donated by A. Smith. Robert Beaumont received a specialty package donated by the Wolverine Brass Works. J. W. Florence was awarded specialties donated by the Quaker City Specialty Co. A swing faucet donated by A. and J. Friedman & Co., went to Paul De Ronde. T. E. Ferrier secured a water heater from the stock of the Passaic Plumbing Supply Co. Peter J. Maher received the toilet combination donated by White & Shanger, and Ray Di Guglielmo received the steam boiler donated by Harris & Jaffe. Herman Imperator received a water heater and rotary hack saw donated by Excelso Specialty Works.

After the distribution, it was decided to call it a day well spent and most of the members departed for home tired and bruised after the fun makers got through with them at the Steeplechase, but nevertheless happy. Several groups who did not seem to have had enough departed in different directions in search of fun and excitement such as only Coney Island can afford.

The entertainment committee, consisting of Harry Walls, chairman; Fred W. Hollister, treasurer; H. F. Cox, secretary; R. F. Ash, John Baker, R. Beaumont, W. Courtright, N. Kearney, W. A. Lane, J. J. Maher, F. A. McBride, Chas. F. Bailey, F. Vreeland, came in for a big round of applause for their untiring efforts in making this outing one of the biggest and finest held by the association.

WESTCHESTER ASSOCIATION SPENDS THE DAY AT CITY ISLAND, N. Y.

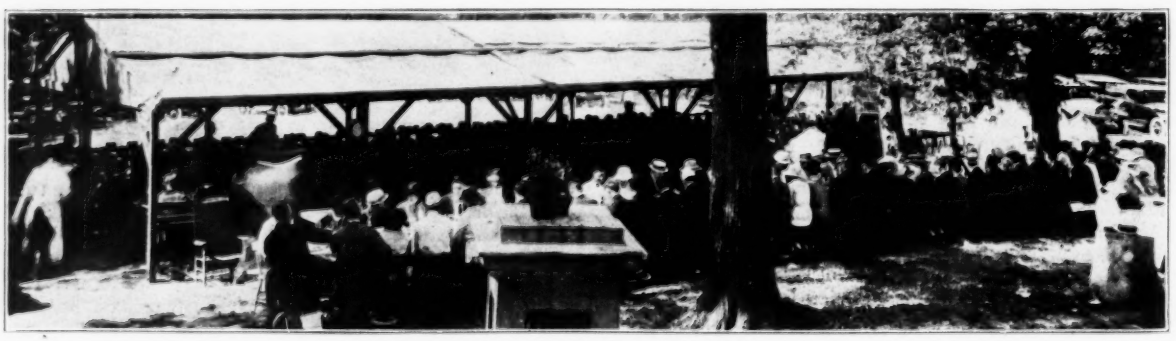
The annual outing of the Master Plumbers' and Steam Fitters' Association of Westchester County, N. Y., was held Thursday, August 9th, at the Colonial Inn, City Island, N. Y. The first event of the day was a baseball game between the plumbers and the salesmen, in which the boys of the grip-packing fraternity took the plumbers over to the final score of 11 to 7.

After the salesmen had thus established their supremacy in the baseball field, the plumbers engaged in a little contest among themselves, in which the sluggers from New Rochelle faced the Mt. Vernon base stealers. A cup, made of pipes and fittings from the shop of A. H. Karl, was the bone of contention in the struggle. The cup must be won twice out of three times before it goes into permanent quarters in either of the two cities, but the New Rochelle aggregation has a start on it, having won the first leg in this game with the long end of an 11 to 5 score to their credit.

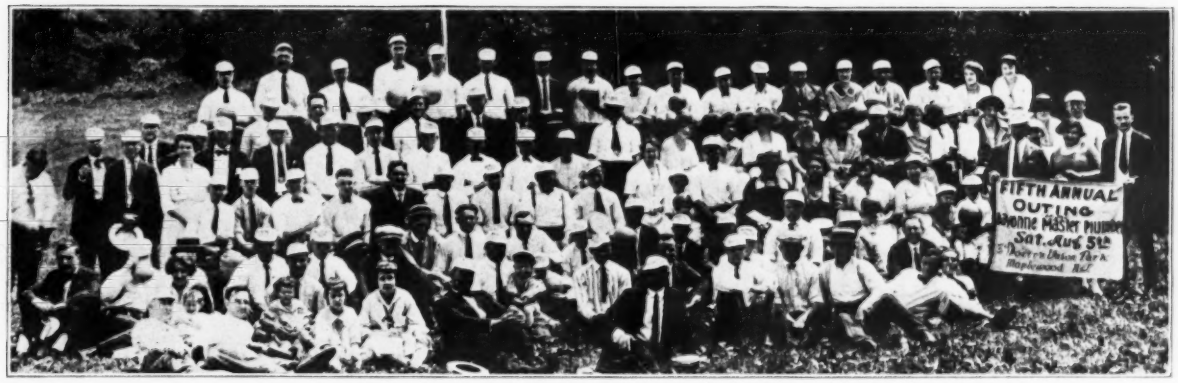
Not being addicted to the game of baseball, the ladies were given opportunity to demonstrate their physical prowess in various athletic contests which followed. Mrs. Wright and Miss Kate O'Keefe won the balloon race; Mrs. Martin lead the field in the egg race, with Mrs. Fisher as her nearest rival. Mrs. O'Keefe and Mrs. Foster captured first and second place, respectively, in the 35-yard dash, and Mrs. Wright was an easy victor over the entire field in the bean guessing contest.

At Westchester County's Outing.—Upper Row: Salesmen's Team; William McGonigal, Umpire of the New Rochelle-Mt. Vernon Game. Center Row: E. Ludington; New Rochelle Baseball Team; Charles Pell. Lower Row: J. B. Clegg, Charles Pell, William McGonigal and Martin Conklin; P. Krauskopf and A. J. Clark, of E. F. Keating Co.; the Baseball Cup and its Maker, A. H. Karl.

It had turned three o'clock by the time the ladies' sports were completed and the motion to postpone the athletic contests until after the clambake was never voted on,—the



Enjoying the Clambake at the Annual Outing of the Master Plumbers' and Steam Fitters' Association of Westchester County, N. Y.



Bayonne, N. J., Master Plumbers' Fifth Annual Outing, Held Saturday, August 5, 1922.—Photo by Sanders Photo Co., Newark, N. J.

clambake was served promptly. Messrs. Houlahan and Watts officiated at this important ceremony, and they left nothing undone in their efforts to provide more food than the crowd could eat.

Following the repast the races were continued, and in every event there was a prize well worth competing for; supply men came through generously with useful and valuable contributions of material, while local associations also donated numerous articles of beauty and value. After the various dashes, scrambles, shoe races and broad jumps were run off, there were still prizes left over and these were distributed to the lucky members of the crowd in the usual manner. Too much credit cannot be given to the committee that perfected the smooth working of all the arrangements for this affair. It consisted of: Richard Holzer, J. B. Minnerly, C. S. Durham, H. C. Braun and Wm. J. Buehler.

BAYONNE, N. J., MASTER PLUMBERS' ANNUAL OUTING.

The fifth annual outing of the Bayonne Master Plumbers' Association was held at Doerr's Union Park, Maplewood, N. J., on Saturday, August 5th. The party of 150 plumbers, guests and salesmen left Bayonne a little after 9:30 in the automobiles of the members. After parading through the streets of Newark, the happy crowd reached the park a little before noon, when a light lunch was served.

The first of the afternoon's events was a baseball game between the Master Plumbers and the Supply Men of Hudson County, won by the Supply Men, 9-7. The line-up was:

Plumbers: Cook, Fectee, Goldstein, A. Friedman, I. Friedman, Rubin, Warshawsky, Vitali and Joffee.

Supply Men: Sharkey, Fitzgerald, Kane, McGeehan, Berger, Stilinsky, Morgan, Fordi and Johnson.

Umpire: Brooks. Score-keeper, Devlin.

The other events were the Ladies' balloon race, in which Mrs. F. Bigg won a box of candy; the 75-yard dash, won by J. C. Sharkey, with a box of cigars as prize; Ring around the 10 pins, Louis Fikete capturing a Stillson wrench; and "Poison," John A. Cook proving to be most deadly and securing a camera.

After the dinner was served, thirty-five prizes donated by manufacturers and supply houses were distributed; the Montgomery Supply Co. passed out candy to the ladies, and the Warren Supply Co. gave pencils to the men.

The final event of the day was a fast four-round boxing match between the Furey brothers, 11 and 12 years old, each weighing 58 pounds.

The committee in charge was J. Groben, chairman and secretary of the association; Ernest Meade, president of the association; M. Terinson, vice-president; and and Charles O'Connor, treasurer.

NEWARK MASTER PLUMBERS TO HOLD OUTING SEPTEMBER 16TH.

The Master Plumbers' Association of Newark, N. J., will hold its annual outing in Hollywood Park, Maplewood, N. J., on Saturday, September 16th. The program for the day includes breakfast, luncheon and a chicken dinner, as well as a baseball game.

Bayonne Master Plumbers' Outing Committee: Vice-President M. Levinson, Secretary J. Groben; President Ernest Meade and Treasurer Charles O'Connor; Montgomery Plumbing Supply Co's Representatives; the Baseball Team; H. A. Boyle, Lovekin Water Heater Co.; William Lodge, of Thos. Savill's Sons; D. J. Curley, Warren Plumbing Supply Co.; Start of the Balloon Race.

MILWAUKEE MASTER PLUMBERS AND THEIR FAMILIES HOLD GREAT OUTING.

The family picnic of the Master Plumbers' Association, of Milwaukee, Wis., held on Wednesday, August 9th, at Waukesha Beach, turned out to be just what the announcements had predicted,—a family picnic. For in its spirit of co-operation, good fellowship and hospitality, the Milwaukee Association is nothing more or less than a big family and the family turned out about five hundred strong for the big annual outing.

From W. E. Goodman, dean of the old guard, and the oldest plumber in the state, down to the youngest hopeful that was able to enjoy a cone or ride on the merry-go-round, happiness was pictured in every face.

Without a doubt, A. S. Dahl, chairman of the entertainment committee, and his first lieutenant, Walter Dusold, were the two busiest men in Wisconsin, from the time the first of the crowd began to arrive in the morning until the last prize had been given away in the afternoon's contests.

There was no formality of time or method of arrival, but most everyone was on hand by noon, when lunches were spread under the trees and the big preliminary event was enjoyed to its fullest extent.

The matter of lunch had hardly been disposed of when signs of a conflict could be seen on the horizon, for the North and West Siders and the South and East Siders were divided into hostile camps choosing teams for the baseball game that was soon in full swing on the diamond. It is a matter of historical record that the North and West Siders won but out of consideration for South Siders' feelings we refrain from printing the score which was terrible. Suffice it to say, that in the first inning, the steady uninterrupted stream of runners crossing the plate was reminiscent of the return of the thirty-second division, and it looked as if the first half of the first would have to be called on account of darkness. The game was stopped in the fifth inning, however, when it was rumored that an officer of the Humane Society was on his way to the grounds to stop the fray.

Then just to show that there were no bitter feelings, the North Side tug-of-war team dragged the crowd from the other end of town around the park a few times in the next contest.

That ended the sectional disputes, and the races were then run off. There were races for men, women and children.

Anyone who couldn't win a prize in the forward race still had a chance to place in the backward races. Fat men were put into a class by themselves, and they raced; children of every age had an opportunity to compete for the many prizes that were distributed. And there were plenty of prizes, so many, in fact that it was almost a problem for the committee to think up enough contests to dispose of them all. One of the events that proved a rare opportunity for those of the gentle sex was the balloon-blowing contests,

At the Milwaukee Family Picnic.—W. E. Goodman; a group of Picknickers Ready to Start Home; A. S. Dahl, President Hugo Lippert and Walter Dusold; A. S. Dahl, Sounding the Retreat; Ed Grassler, Seated with Audrey and Virginia Dusold; Plumbing Inspector G. Stolz and Mrs. J. Brah; Ed. Grassler Surrounded by a Group of Admirers; the North Side Mascot; the North Side Baseball Team; the South Side Baseball Team; Walter Dusold.

Members of the Maryland Master Plumbers' Association, Their Families and Friends at this Organization's Annual Outing, [illegible]ust 9, 1922,

At Maryland Master Plumbers' Outing.—Upper Row: William F. Myers, President of the Maryland Association and Chairman of the Outing Committee; St. Mary's Band; Start of the Sack Race; Motorcycle Escort. Center Row: Start of the Egg Race; Washington Delegates in Attendance. Lower Row: Some of the Members and Guests; the Refreshment Counter; Mr. Mylander, Mrs. and Mr. C. King, Mrs. William McPhail, Mr. and Mrs. Ferd Eidman, and Mrs. Mylander.—From "Domestic Engineering" Photo.

in which "Domestic Engineering" balloons were put to the severest test possible won.

By the time the sports had been concluded it was drawing toward evening, long shadows were creeping across the fields, and the various groups of the big Milwaukee family sat down to finish the contents of the baskets. And as they talked, and smoked and exchanged reminiscences of the olden days, many interesting tales were recounted, for it was on the same lake that the whole National Convention had gathered in '93, and conventions in those days were,—well Hugo Lippert says there was something about them then that is lacking now. What it is, the scribe failed to find out.

And, then, after a little while, with no more formality than a cheery goodbye here, a friendly handclasp, a pleasantry there and an admonition to another to "take care of yourself," the picnickers dispersed "till we meet again."

WASHINGTON DELEGATES ATTEND MARYLAND OUTING.

The Annual Outing of the Maryland Master Plumbers was held at the Maryland Swimming Club, Dundalk, Md.

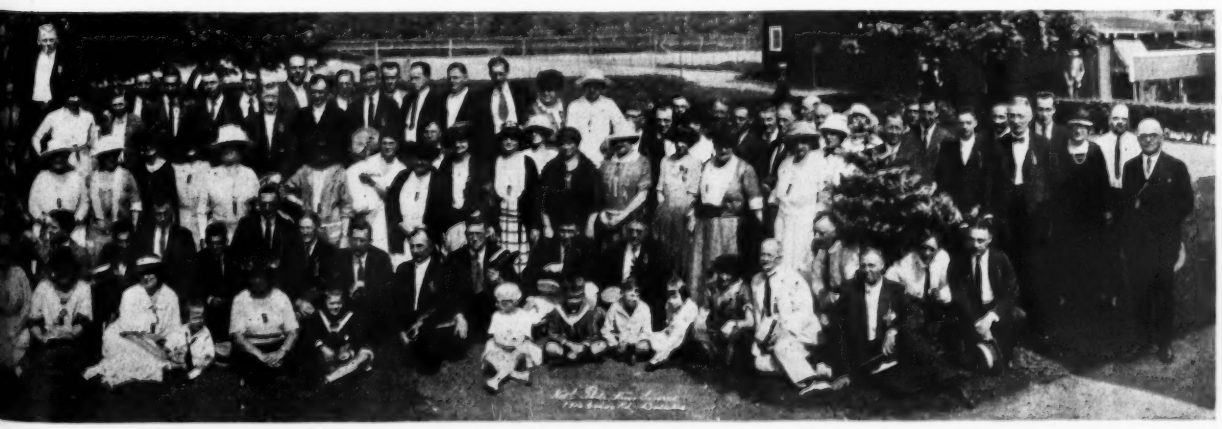
On Wednesday afternoon, August 9th, the committee, headed by Wm. F. Myers, stationed itself on W. Mulberry Street, Baltimore, and as the machines drove up each driver was given two flags and a sign which read "Master Plumbers" No. 21 with a number. There were 69 cars carrying about 300 people. Cards had been printed, which gave the driving instructions and route. As each car was decorated it moved down to Cathedral Street, where the parade started. A band lead in a large truck, and with a motorcycle escort the parade moved through the town and then out to the Maryland Swimming Club.

On arrival the cars were parked, a large group picture was taken, and the program of fun started.

An egg race for the ladies, run in three heats, was won by Mrs. Yewell, Mrs. Haines of Washington and Miss Dorothy Yewell.

In the ring toss contest Mrs. Wm. McPhail proved to have the best eye and won first prize, with Mrs. Maeick second.

The sack race for men brought forth Baltimore's best, and our friend of many outings, Tom Thaler, won first prize. A sack race for the Washington delegation was run off and A. P. Bovello won the cigars.



9, 1922, at the Maryland Swimming Club, Dundalk, Md.—Photo by National Photo News Service, Baltimore, Md.

A tug of war between Washington and Baltimore was the sensation of the day, when Baltimore, slowly but surely, pulled the Capitol plumbers over the line.

Music played all afternoon, and after a few dances dinners were served in the club's dining room. Soft shell crabs, Maryland chicken, corn on the cob, coffee, and cherry pie, composed the menu, with trimmings.

A nice beach in front of the club enticed a number of the crowd who were known to be partial toward aquatic sports and they enjoyed the dip very much.

After dinner pick up ball teams played five innings and attracted a large audience. As it grew dark the machines started to leave for the city, and by 9:30 every one of the picnickers had started for home. The Washington contingent was represented by a delegation of 17 men who came over from the "District" for the day.

CINCINNATI PLUMBING CONTRACTORS SPEND WEEK AT CEDAR POINT, OHIO.

Early Sunday morning, August 6, a number of Cincinnati master plumbers, with their families packed their baggage in automobiles and hit the open road for Cedar Point, a well known summer resort across the state from Cincinnati.

Arriving at Galion, Ohio, in the late afternoon the party disembarked and had dinner, and spent the night at the hotel where advance arrangements had been made for their entertainment. The early morning again saw them on the road to Cedar Point.

Arriving at the resort they took up their headquarters at the Breakers Hotel where everything was in readiness for their reception and there they remained until August 15.

Cedar Point is a delightful vacation place, and while there the Cincinnati people enjoyed it to the utmost. Their time was spent in boating, fishing, bathing, dancing and on motor trips to the various points of interest in the vicinity. The program, as arranged by E. Frank, provided for some new pleasure every day of the stay there.

John Vogelpohl with Mrs. Vogelpohl and five children took first place in all of the round-table events, of which there were three a day, and we have it on good authority that when they approached an amusement stand the tired "barker" took a new breath, got out a fresh roll of tickets and started in with renewed vigor. There were fifty-nine in the party.

TORONTO SOCIETY DOMESTIC SANITARY AND HEATING ENGINEERS HOLD ANNUAL PICNIC.

Despite somewhat threatening weather a splendid day's fun was had by the sanitary and heating engineers of Toronto in company with members of local supply firms and manufacturers, at the annual picnic of the association held at Exhibition Park, Toronto. Practically everyone brought wives, sweethearts, children or friends, and many hundreds were in attendance when the enjoyment was at its peak.

Supper was served in the Horticultural Building by the ladies, and plenty of refreshments were on hand for all. Dave Norwich and Archie Melhuish took charge of the ice cream freezers and were naturally the center of much attraction for both young and old. Other personages of equal interest to the kiddies were Wm. H. Cunningham, of W. H. Cunningham & Hill, Ltd.; Ed. Needham and Jim Bell, of the Wolverine Co. The latter two had a big stock of toy balloons, while the former told many yarns of interest and full of thrills concerning various fishing trips. Major L. L. Anthes, of the Anthes Foundry Co., was also prominent among those in attendance.

As usual the big feature was the baseball contest between the teams representing the plumbing and heating branches of the association. Bassill pitched for the plumbers and showed such form that it was rumored the major league scouts were nosing around. Patterson, Menzies and Horsburgh were prominent in the hitting columns by knocking many home runs to the delight of the onlookers.

The Plumbing team consisted of Messrs. Patterson, Horsburgh, Spring, Willy, Anthes, Cooke, Bodington and Needham. The Heating team comprised Messrs. Hill, Madden, Booth, E. Byrne, Long, Tuckey, Hungerford, Ford and Menzies. The final score was 10-8 in favor of the Plumbing team. The game was hardly finished before the threatening rain broke loose and all had to retire to the Horticultural Building to continue the amusements.

In the various races there were many close finishes. One of the surprising things was the fleetness of foot of Garrett Frankland, the genial secretary of the Toronto Society. Mr. Frankland was foremost in the races on the recent Field Day, but there were those who said he was in rare form that day. His performance in coming second in the fat man's race on the picnic day showed that he is no flash in the pan. After the races a splendid supper was enjoyed by all.

At Cincinnati Master Plumbers' Outing. Upper Row: John T. (Jack) Cripps, of Eagle-Picher Lead Co.; A. J. Murphy, W. E. Mueller, E. B. Kleine, Ethel Haerling, Laura Grogan, Ruth Vogelpohl, Martha Grogan, Magdalene Mueller, Marion Doyle, and Lucille Haerling, P. J. Cluxton, Willard Gervers, John J. Vogelpohl, Louis Haerling and Edward Frank. Center Row: Mrs. John J. Vogelpohl, Mrs. F. B. Ficker, Mrs. W. E. Mueller and Mrs. Louis Haerling, Mrs. A. J. Murphy, Mrs. E. B. Kleine, Mrs. P. J. Cluxton and Mrs. William Gervers. Lower Row: Mrs. Mason, Mrs. John T. Cripps, Mrs. James Doyle and Mrs. Edward Frank; Children at Outing; E. B. Kleine, William Gervers, Frank B. Ficker and James Doyle.

REFUSES TO LET PLUMBING AND HEATING CONTRACTS SEPARATELY.

Government Will Not Depart from Old System This Year, Committee Reports.

Walter D. Nolan, of Washington, D. C., was recently appointed a committee of one by the National Association of Master Plumbers, to investigate the possibility of the letting of the plumbing and heating contracts as separate items, on government work in the future. After many long conferences with army officials and other government parties, Mr. Nolan reported that the appropriations for 1923 were made on July 1st and that it is impossible to secure any change in the method of the letting of contracts for work during 1923. He found the government officials loath to depart from a custom of some years standing and let the plumbing and heating contracts separately, and expressed it as his opinion that the only method of securing such a change, was through legislation. In closing his report, Mr. Nolan offered as his suggestion, that the Executive Board of the National Association get busy at once taking such steps as may be necessary to secure the passage of favorable legislation in order that by the time contracts for 1924 are let, it will be possible to secure the plumbing and heating contracts separately.

Construction of three of the new war veterans' hospitals is said to be under way, under direction of the Director of the Veterans' Bureau, with whom is associated the Bureau of Yards and Docks and the Construction Service of the Quartermasters Corps. The new hospitals are to be located in Massachusetts, Ohio and Washington.

INDIANAPOLIS MAKES GOOD SHOWING IN JULY BUILDING.

Plumbing and heating contractors of Indianapolis and others connected with the building trades are particularly well pleased with the showing made by the city in building construction during the month of July, when 1,167 permits were issued on a total valuation of $3,349,348. This is not only a substantial increase over the figures of July, 1921, both in valuation and permits, but marks July of this year as one of the banner months in Indianapolis construction. In the corresponding month last year, 861 permits were issued, representing a total valuation of $1,401,115.

With the valuation of buildings on which permits have been issued during the first seven months of this year amounting to $16,342,680, it is apparent that the total for the year will go over the $20,000,000 mark unless a decided slump

T. A. Wenger, Buffalo Forge Co.; F. H. Valentine, of Mayer, Valentine & Cameron; Wm. Clarke, Becker-Seidel Co.; Jas. Mason, Utica Heater Co.; E. F. Rather, Johnson Service Co.; F. D. Rollins, U. S. Radiator Corporation; Wm. M. Kingsbury; Frank G. Phegley.—From "Domestic Engineering" Photo, taken at the Recent Joint Outing of Cleveland (O.) Heating & Piping Contractors and the Ohio Chapter of American Society of Heating and Ventilating Engineers.

Cut Your Service Costs

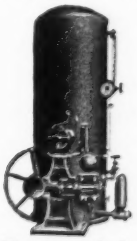
Every time you are called to "service" a motor on a house pump you have sold, your profit is reduced.

It also means that a customer is not obtaining the desired results from a product bought from you. You lose good-will as well as money.

You can cut service costs and retain your profits by selling and installing house pumps and other machines equipped with G-E fractional horsepower motors.

For over 25 years the General Electric Company has been building motors that give reliable service—that do not require constant repairs or adjustments.

All who buy, sell or use G-E motors have this basis for their assurance of dependable motor operation. Any one of our sixty sales offices will furnish the names of G-E motor equipped water systems and other devices in which you may be interested—or address General Electric Company, Fractional Horsepower Motor Sales, Ft. Wayne, Ind.



Manufactured by Columbiana Pump Co., Columbiana, O.

You save money and goodwill when you install a motor of known dependability—Why take chances on unknown makes?

General Electric Company

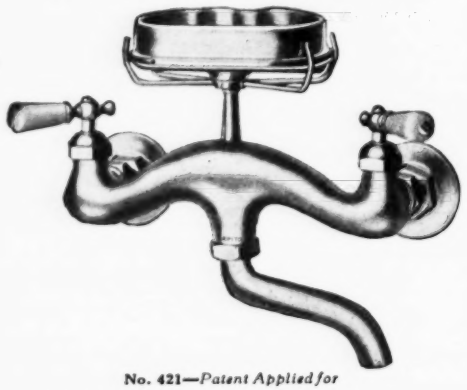
General Office Schenectady, N.Y. Sales Offices in all large cities

Capitol Products

Always Satisfy

Attractive Design—High Grade Metal—Superior Workmanship Carefully Inspected and Tested

Combination Sink Bibb



No. 421—*Patent Applied for*

Our plumbing fixtures are made of a high grade steam metal composition, consisting of only the highest grade virgin metals, thereby giving long wear to seats and threads, and a finish that is lasting

The Capitol Line Includes:

Radiator Valves	Boiler Trimmings
Packless Radiator Valves	Fusible Plugs
Gate Valves	Basin Cocks
Globe Valves	Sink Bibbs
Check Valves	Air Cocks
Pop Valves	Steam Gauges
Relief Valves	Vacuum Gauges
Lavatory Valves	Altitude Gauges
Mixo Bath Cocks	Drain Cocks

Combination Laundry Tray Bibb

(With Unions)

No 420—*Patent Applied for*

Also furnished without unions

Capitol Brass Works

DETROIT, MICHIGAN

sets in. Plumbing and heating contractors and other tradesmen believe this is only a remote possibility and that 1922 will be a record year in building construction.

The valuation now only lacks $1,986,285 of equaling the total of $18,328,965 which was reached in 1921. The valuation last year was the highest recorded up to that time in the history of the city and established a record in addition to giving concrete proof that the construction business was on a sharp upward grade and recovering rapidly from its low wartime level. The figures for the first seven months of the year show a decided increase in dwelling house and fireproof building construction. Dwellings have been erected to the amount of $6,822,926, about one-third of the total building valuation since the first of the year.

SOUTH BEND HOME BUILDING TO TOUCH $4,000,000; PREDICTED.

Between $3,000,000 and $4,000,000 will be spent for home building in South Bend, Ind., this year, according to the estimates of plumbing and heating contractors and others in touch with the city's building conditions. The figure, which is said to be the largest ever spent in a single year for new homes by any Indiana city outside of Indianapolis, is at least a million and a half more than South Bend spent last year or the year before.

Despite the size of this amount there is no indication in the opinion of the contractors and builders that this will build all the homes that are needed. At least two million of the four that building men expect to be spent this year will be expended by individual builders. Companies interested in the construction of homes and realtors will spend the other million and a half or two million.

According to figures compiled by the city building commissioner for the month of July, there were 454 permits issued for a total valuation of $872,773. During June there were 462 permits issued for a total valuation of $1,875,052, but of this amount about $1,400,000 was for new buildings for the Studebaker Corporation and the Palace Theater Corporation. During the month of July, 184 permits for new dwellings were issued, exceeding that of the previous month by 52. Since May 1 of this year, 503 new dwellings have been built at an estimated cost of nearly $2,000,000.

CAMDEN ASSOCIATION SEEKS 100 PER CENT MEMBERSHIP.

Within the next two weeks the Camden, N. J., Master Plumbers' Association will inaugurate a drive for new members. It is planned to divide the present association into two groups, one headed by Lionel C. Simpson, and the other by W. Bradford Williams, advertising manager of the Camden Post-Telegram, for the purpose of making it a competitive affair. The side securing the greatest number of applicants will be entertained by the loser. The entertainment will be a banquet and theatre party.

The competition promises to be keen, for already certain persons have two or three names ready to submit for membership.

The recent outing of the association at Alcyon Park, which was a great success, has brought in a great number of applicants, and it is predicted that before another year has passed, the association will be 100 per cent strong in that town.

William Swindells, a retired master plumber of Lawrence, Mass., died recently at his home in that city in his 74th year. He was born in England and came to America in his youth. He was the founder of the plumbing and heating business, which is now being conducted by his son and daughter under the name of W. S. & K. Swindells.

BUILDING CONDITIONS GOOD IN KANSAS CITY, MO.

Over three hundred permits have been issued in Kansas City, Mo., in the past three weeks. The greater number of these were for small cottages and bungalows, although a few apartment houses and apartment hotels are included in the list.

The installation of oil burners is providing the plumbers of this city with a considerable amount of work, and the coal shortage expected this winter is causing a good many householders to turn to this source of fuel supply for relief from the high coal prices that are expected.

Among other building projects planned at this time is a one-hundred room home for nurses at the General Hospital. This building is to connect with the hospital and is expected to be ready for work in a short time. The plans call for an addition to adjoin the hospital to the south and east with an apartment building at a cost of from $75,000 to $100,000.

Latner Bros. have the plumbing contract for an eight-story apartment hotel at 815 Armour with over three hundred fixtures.

The Wm. V. Chapman Co., of St. Louis, has a contract for plumbing in an apartment hotel at Armour and Holmes.

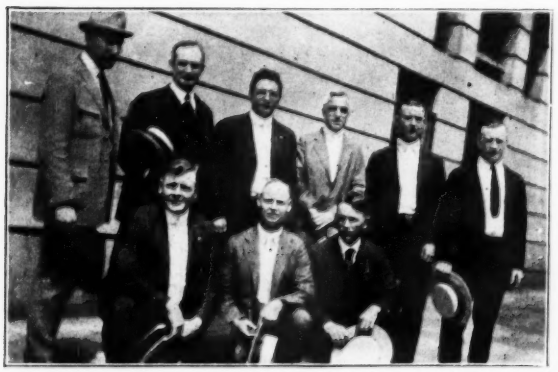
The contract for the plumbing of the new Kansas City Athletic Club, the biggest job in Kansas City, with over fourteen hundred fixtures, has been let to the W. G. Cornell Co.

The Board of Education has just awarded several contracts for work on the school buildings. Among these was a contract let to the United States Engineering Company for heating and ventilating the addition to the Attucks school for $24,600. The plumbing and drainage contract on this building was let to W. D. Reed Plumbing Co. at $10,200.

WALTHAM, MASS., JOURNEYMEN WIN INCREASE IN WAGE SCALE.

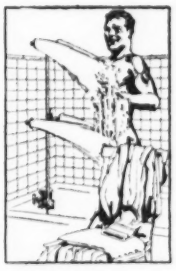
The journeyman plumbers of Waltham, Mass., were successful in having their wages raised from 90 cents to $1 an hour as the result of a resolution passed by the union demanding that a wage scale of $1.12 be adopted as the new rate. The master plumbers offered a compromise wage of $1 which was accepted without a dissenting vote by the journeymen.

Mt. Pleasant, Iowa.—E. A. Salzman has purchased the plumbing and heating business of the L. A. Miller Company.



Wm. J. Woolley, of Evansville, Ind., Secretary-Manager of the National Trade Extension Bureau, and Jos. W. Cannon, of Chicago, Past President of the National Association of Master Plumbers, and Other Prominent Men at the Recent Convention of Florida State Association of Plumbing and Heating Dealers, held at Jacksonville, Fla.—From "Domestic Engineering" Photo.

Do You Display Kenney Showers Properly?



Are you getting all the sales possible out of your Kenney Shower window display? If not there is a reason.

Attach Kenney Shower Price Cards to each fixture and trim your window with Kenney Shower display signs; then notice the difference in your sales.

A frequent change of display also keeps up the public interest.

And don't overlook the Kenney Shower stationary models. The New Congress Concealed model set in a tile board display (one display frame furnished free to each customer) in your show room, as illustrated, will attract attention and create sales.

Congress Concealed Model

The Kenney-Cutting Products Corporation

Successors to the
Curtainless Shower Company

507 Fifth Ave., New York City

Steamfitters Up Against Greenhouse Heating

GIBLIN GREENHOUSE BOILER

It lets the Florist Sleep

THIRTY TWO YEARS experience has convinced Florists they need this boiler.

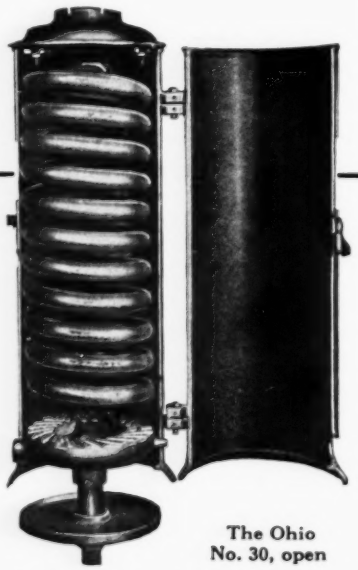
THIRTY TWO YEARS advertising to them, makes them ready to buy.

WE AID STEAMFITTERS in selecting radiation and boiler for Florists and act for them as **Heating Engineers.**

SEND FOR OUR CATALOG AND PRICES

GIBLIN & CO., Utica, N. Y.

Makers of Greenhouse Boilers



The Ohio No. 30, open

Make Money with the OHIO

THE Ohio Gas Water Heater sells at a price that nets you a good profit—and stays sold. Made in three practical sizes covering all requirements of your trade. No loose parts to stock. Adjustable to any gas pressure.

Get acquainted with the OHIO line. Ask your jobber, or write us direct.

Manufactured and Guaranteed by

The Ohio Heater Company Columbus, Ohio

BOSTON BUILDING TRADES RETURN TO CLOSED SHOP.

Representatives of the Building Trades Employers' Association of Boston, and of the United Building Trades Council of the same city have signed the first agreement between the employers and the unions since the strike in the building trades, more than two years ago.

Under the provisions of the agreement, Boston is to return to the closed shop basis, the system under which it operated before the strike. Wages and working conditions are stipulated under the contract which is to continue in force until April 1, 1923. As provided in the agreement, journeyman plumbers and steamfitters will receive $1 an hour.

FT. WAYNE FACES SUPPLY SHORTAGE.

The city of Fort Wayne, Ind., is facing an acute shortage of building supplies. Unless the situation is relieved within the next week or ten days by shipments of cement there can be no building of any kind started after two or three weeks, according to the building supply dealers of the city. Shortage of coal at the mills is ascribed as the cause of the condition. With a number of the cement mills in Michigan and Illinois shut down or partially closed on account of the strike situation it has been practically impossible for the dealers to get cement.

The contract for the installation of plumbing in a new ten-room addition to the South Wayne school at Fort Wayne, Ind., has been awarded to the Fort Wayne Plumbing and Heating Company on its bid of $10,460. The heating and ventilating contract was awarded to the firm of Schwegman-Witter at a bid of $24,725. The P. B. Arnold Company, of Fort Wayne, has been awarded the contract for the installation of a plumbing system in the new gymnasium and shop building at the Central high school. The company's bid was $5,000.

FINDS LARGER QUARTERS.

Thos. F. Martin, formerly at 6 North Avenue, New Rochelle, N. Y., has moved across the street to 9 North Avenue, where he will have larger quarters, a bigger shop and better show window facilities.

RETURNS FROM TRIP TO EUROPE.

F. A. Bickert, of the Camden Heating Co., Market Street, Camden, N. J., has just returned to his home after a three months' tour of Europe.

CAMDEN ASSOCIATION TO HAVE CO-OPERATIVE SHOWROOM.

The master plumbers of Camden, N. J., have gotten together and leased the display rooms and offices of Lionel C. Simpson Plumbing and Heating Company, at 500 Broadway, for the purpose of establishing a master plumbers' co-operative showroom. The location is ideal. The plans are to have two salesmen in charge, assisted by a stenographer, and a porter. The room will be open from eight o'clock in the morning until eight in the evening every day of the week, excepting Sunday. Friday and Saturday it will remain open until ten-thirty p. m. The display will be illuminated until eleven o'clock every evening.

The purpose of the showroom is to educate the public along the lines of good plumbing and good plumbing fixtures. It is sort of a "follow-up" to the association's advertising campaign, which is now in progress. The local jobbing houses are heartily in favor of the idea and are lending their aid.

ALL EMPLOYES TO BE SHAREHOLDERS IN COMPANY.

Lionel C. Simpson Plumbing and Heating Co., Camden, N. J., to Develop New Style Organization.

Lionel C. Simpson.

Lionel C. Simpson, of 500 Broadway, Camden, N. J., who has turned over his display rooms and offices to the master plumbers of Camden as a co-operative showroom, will move to his new quarters at 816 Division Street, Camden. The new quarters will consist of an office, estimating room and warehouse. There will be no display room as heretofore. It is Mr. Simpson's plan to use the co-operative showroom whenever necessary. His plans, hereafter, are to have everyone of his employes a shareholder in the company. There will be officers and a board of directors and a general manager. Every man will be educated along salesmanship lines and will be rewarded by a certain percentage on his sales. Being a member of the firm and reaping a percentage on his personal sales, in addition to his stock dividends, should certainly be some incentive to the mechanic. It will, Mr. Simpson hopes, develop an organization second to none in the country.

OPENS BRANCH OFFICE.

Herbert Morgan, 102 Scovel Avenue, Merchantville, N. J., has opened up a branch shop at Camden, N. J., on Hudson and Federal Streets, where he will handle his regular line of heating and piping work.

SUCCEEDS WEST END PLUMBING CO.

G. Passmore Taylor informs us that he has succeeded to the West End Plumbing Co., of Chester, Pa. and has opened a plumbing and heating shop at 1108 West Seventh Street.

MOVES TO MAIN STREET.

Edward F. Dwyer, plumbing and heating contractor of Norristown, Pa., has left his old location at 200 De Kalb Street to take up business in his new offices and display room at 335 East Main Street, in that city.

H. C. Richards, C. D. Hickman, W. P. Culbert and W. G. Culbert, at a Recent Tournament of the Philadelphia Heating and Ventilating Golf Association.—From "Domestic Engineering" Photo.

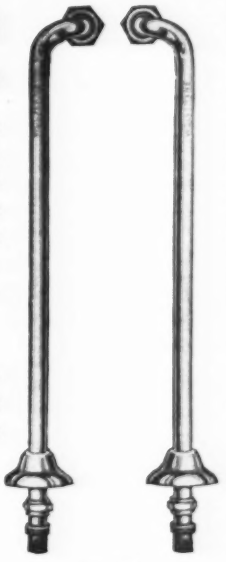
Easy Installation

Economical

Lasting Service

Wolverine One-Piece Basin and Bath Supplies are adapted to all requirements where the combination of service and attractive appearance is of prime importance.

Threaded top, threaded friction ring, perfect cone packings insure perfect joints.



We Sell the Retail Plumbing Trade Exclusively

No. 520

WOLVERINE BRASS WORKS
Manufacturers
GRAND RAPIDS, MICH.

WOLVERINE CO., Inc.
New York, N. Y.

WOLVERINE BRASS WKS., Inc.
San Francisco, Calif.

Announcement

A New Backwater Float

Non-corrosive, will not break or dent

* * * *

Guaranteed for Five Years

* * * *

Slight additional cost, superior to Copper Floats

* * * *

Ask Your Jobber

* * * *

The Cooper Foundry Co.
Atchison, Kansas

Somerville
(S. I. W.)

Soil Pipe and Fittings

Are mechanically correct

HAVE you used Williams' "Falcon" Drop-Forged Chain Pipe and Fittings Wrench?

It's the greatest improvement in pipe wrench design, users tell us, since we introduced the "Vulcan."

Six sizes, with either flat link or cable chain, for ⅛ to 12-inch pipe and fittings. Send for booklet.

J. H. WILLIAMS & CO.
"The Wrench People"

BROOKLYN 17 Richards St. | BUFFALO 17 Vulcan St. | CHICAGO 1017 W. 120th St.

NEW APPOINTMENTS TO BRIDGEPORT PLUMBING BOARD.

Mayor Walter Atwater, of Bridgeport, Conn., has appointed William P. Steele and Philip J. Smith to serve as members of the Board of Plumbing Examiners. The former is a master plumber and succeeds Harry D. Fitzgerald, while the latter is a journeyman.

MANCHESTER, CONN., PLUMBER TO ENLARGE STORE.

F. T. Blish, proprietor of the Manchester Plumbing & Supply Co., of Manchester, Conn., has had plans prepared and will soon let contracts for an addition to his store, 40x165 ft. The front of the building will also be remodeled with a new store front. This will give the company a floor space on the street floor of 225x80 feet.

TAUNTON, MASS., PLUMBER PROVES HERO.

Robert MacAdam, a plumber in Taunton, Mass., is receiving congratulations for his heroism in saving a boy and girl from drowning recently at Onset Bay. The girl had attempted to rescue a drowning boy but the latter had carried her down with him. MacAdam dove, loosened the boy's hold on the girl, who rose to the surface and brought the boy to the top, and swam to a wharf with both of them. Both were revived with pulmotors.

CONTRACTS LET ON NEW SHOP FOR HOBART & FARRELL.

Hobart & Farrell, Inc., plumbing and steamfitting contractors of Brockton, Mass., have let contracts for the erection of a three-story brick block on Court Street, in that city. They will occupy the street floor and the basement. The contract provides for the completion of the building within six months. The concern now occupies a store on School Street.

TAKES NEW STATE AND MUNICIPAL CONTRACTS.

John J. Dowd of Holyoke, Mass., has been awarded the heating and ventilating contract for the new elementary school at Fairview, Mass. The contract is in excess of $7,000. He has also been awarded the heating, ventilating and plumbing contracts for the five new buildings to be erected at the new State Hospital for the Feeble Minded at Belchertown, amounting to $30,000.

GET TIPS FROM ELECTRICAL MERCHANDISERS.

Member of Electrical Development League Speaks Before San Francisco Sanitary Development League.

L. J. Waldear, secretary for the San Francisco Sanitary League, has just returned from the East, and reports a very pleasant though busy time. Respecting the Sanitary League, he reports that the rate at which membership is growing indicates that they will soon count members by the hundred. The Publicity Committee, of which he, under the by-laws becomes ex-officio member, has not yet organized in good form for business. Mr. Waldear remarked, in regard to the July meeting: "At the last meeting of the league we were favored with a very interesting talk by Mr. Elliott, of the Electrical Development League, who outlined the wonderful possibilities of an organization that was effective in the education of the public in the value of sanitation and also the education of those engaged in the business to serve the

public properly. Gean Blum also made a fine talk emphasizing the fundamental principles expressed by the league as the standard for carrying on its activities. He also spoke in glowing terms of the splendid attendance at the luncheon, manifesting the interest of all the trade in the commendable program to be carried out."

PLUMBING ORDINANCE FOR HOUSTON, TEXAS.

Three experienced plumbers testified before the city council of Houston, Texas, as to the value of the proposed new plumbing code which the council afterward adopted. The code will not be effective until January 1st, so that contractors will have an opportunity to use up materials now on hand. The ordinance was endorsed by Franklin O. Thompson, J. W. Theil and Henry Warren.

SMALLER TOWNS IN OREGON REPAIR AND REMODEL SCHOOLS.

Reports from smaller cities in Oregon indicate that building construction has been fairly active all during the summer, with an unusually large amount of school repair and new school construction.

John Melville, plumbing contractor of La Grande, received the contract for plumbing to be installed in connection with remodeling and improvements at the High school building and Central school building in that city.

Finnegan Bros., of Portland, have been awarded the contract for installing plumbing in the proposed La Pine school building to be erected at a cost of $20,000, at Bend, Ore.

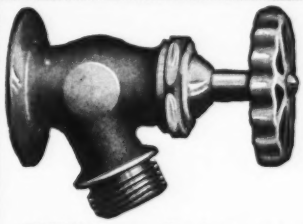
The contract for heating and plumbing changes in the Astoria school building has been awarded to Westerund & Ness, of that city on a bid of $1,802.

PORTLAND SCHOOL PLANS EXCEED APPROPRIATIONS.

Progress with the proposed extensive building program planned by the School Board of Portland, Oregon, will probably be delayed somewhat, because the tentative building program adopted by the board has been found to be approximately $175,000 in excess of the $4,000,000 bonds voted at the special election in June. The board will make an immediate survey of the situation, and decide where the saving of $175,000 may be effected with the least possible damage. Further action on the building question has been deferred until September, when it is expected that plans will have been sufficiently developed to proceed with construction.

Rushlight & Hastorf, of Portland, received the contract recently for plumbing and heating in the proposed $125,000

Shawnee Convention Committee: W. R. Roesch, R. J. Reid and E. M. Stanmire.—From "Domestic Engineering" Photo, Taken at Oklahoma Master Plumbers' Recent Convention in Shawnee, Okla.



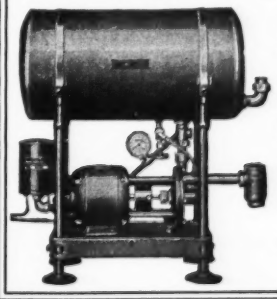
PERU
Sill Cocks
Standard in Every Respect

PERU Brass Products are made of highest grade materials. Every piece bearing our trade mark can be relied upon for quality, service and durability.
Write for Details and Prices.
PERU BRASS & MFG. CO., Peru, Ind.
New York Representative:
MELVIN A. ROSENBERG, 108-110 W. 34th St., New York City

"Thrift" House Heating Range
Heats 8-room house by hot water. Gives separate domestic hot water. Cooks and bakes. No extra coal. 350 sq. ft. of radiation. 70° in zero weather guaranteed.

Write for details. Exclusive agents wanted
Zimmerman Stove Heater Corp.
Jamaica, N. Y.

Not for a Year or Two but for A LIFETIME



This is the service you can expect from a Decatur Water System. Pump in operation has demonstrated that this is not unreasonable service to expect from the Burks Pump used in Decatur Water Systems.

Send for Bulletin No. 78

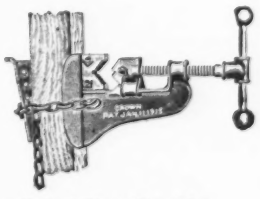
DECATUR PUMP CO.
Decatur, Illinois

Post Pipe Vise
Holds Tight and Firm Anywhere

Can be attached to any wood or iron, round or square post, pole or tree.

Jaws of best tool steel, hardened and drawn. Will not crush or allow pipe to slip. Made in two sizes.

Write for particulars and catalog.



Ask your jobber for "Crown" Post Vises, Pipe Dies, Pipe Cutters, Etc.

CROWN DIE & TOOL CO., 555 W. Monroe St., Chicago

Tank Fittings of Quality

1856 "McSHANE" 1922

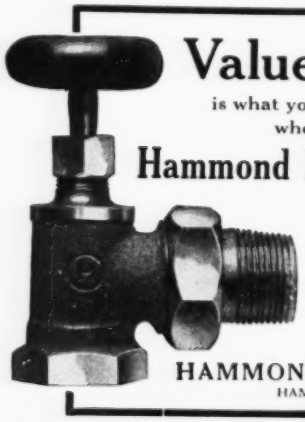
The ORIGINAL Compound Lever Ball Cock
Elevated, Low-Down, Top and Bottom Supply
Tank Levers and Valves

McSHANE BELL FOUNDRY CO.
BALTIMORE, MARYLAND

SQUARE "GEE"
Malleable Iron Pipe FITTINGS

In order that our customers may be sure that they are getting our fittings we stamp a square G on every fitting.

THE GRABLER MANUFACTURING CO.
CLEVELAND, O.



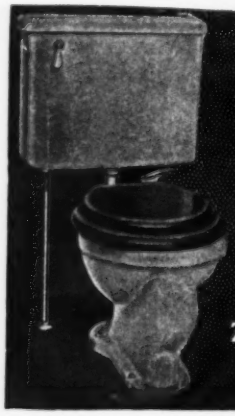
Value Received
is what you give every customer when you install a
Hammond Radiator Valve

They last long, and while lasting, give satisfactory service.

Built so they cannot leak. Made in standard patterns for steam and hot water.

Ask your jobber

HAMMOND BRASS WORKS
HAMMOND, INDIANA



ZECO

A vitreous china tank with a set of real fittings

ZWERMANN COMPANY
Robinson, Illinois

high school to be built at Dayton, Wash. The heating contract totaled $22,774, and the plumbing, $5,866.

Buildings at the University of Oregon, which were destroyed by fire on July 29th will be replaced immediately, at a cost of $60,000 to $70,000. The construction which has been authorized by the University Board will complete the architectural quadrangle, with a building for fine arts and architecture.

According to an announcement of the School Board of Portland, construction of the new Northeast high school building, to cost $450,000, will be started within a few months. The preliminary plans provide for the main building, power house, gymnasium, and several other units. A site of 40 acres has been secured.

BETTER TYPE CONSTRUCTION NOW UNDER WAY IN TORONTO.

During last month the wholesale price index of 48 building materials in Canada advanced slightly and is now 79.7 per cent above 1913 compared with a peak of 183.8 per cent in May, 1920. Prices have now declined 36.6 per cent from the high. The recent slight upward trend in material costs is the result of a sudden demand for material and labor at a time when stocks are low. It is interesting to note that production is increasing and that a large proportion of the building material plants are working full time and in many cases overtime in order to meet the demand. It is not anticipated that cost increases will be great; in fact the cost of building will over a long period of years decline gradually. This is the logical prediction of authorities, and it is being acted upon by many builders.

Discussing this matter with a prominent Toronto contractor it was stated to "Domestic Engineering" that it is apparent that we have passed the crest of the first wave of building activity represented by speculative development. We are now entering the second and sounder period wherein better types of buildings will be constructed, and there will be much greater activity in architectural offices. Many large building projects held up during years past are now being rapidly developed into the contract stage and considerable activity is in prospect for sanitary and heating engineers and others interested in construction. Many better type homes and a great number of educational and institutional buildings, public and business buildings, are now being planned, and much activity is expected this fall.

AN IMPORTANT DISCOVERY.

A discovery of much interest to heating engineers and manufacturers of heating equipment is that of a new source of soapstone at Wabigoon, near Dryden, Ontario. There is a large body of soapstone there and very little overburden. The stone is soft enough to cut readily with an ordinary saw. It is a dark greenish-grey rock, composed largely of talc and is very similar in appearance and composition to the so-called "alberene stone" of Virginia.

PLUMBERS' TEAM IN TOP POSITION.

Kingston, Ont., Plumbers' baseball team proved its right to hold top position in Group B of the Mercantile League, by defeating Tanners by 10-7, before a large crowd at the last game. The Plumbers' team consists of Messrs. Shangrow, Fenning, H. Richards, Lawless, Murray, Arneil, Ferguson, McGuire and S. Richards.

BUILDING RECORD IN VANCOUVER.

The high mark in building permits for Vancouver was reached during July when building permits totalled $451,470. Last year for the same months permits totalled $265,581.

For the seven months of this year total figures have reached $2,464,901, as against $1,925,963 in 1921.

SEATTLE COMMUNITY HOTEL OVER-SUBSCRIBED.

With an oversubscription of $150,000 to the proposed Community Hotel fund to provide for the erection of a large hotel in Seattle, a total of $2,854,000 has been sold in the city to local investors. Frank Waterhouse, president of the Community Hotel Company, consisting of business men of the city, headed the selling campaign, which was finished in less than a week. Plans for construction will be gotten under way immediately, and it is expected that the building will be ready for operation not later than the summer of 1924.

Buildings constructed and under construction in Seattle the first seven months of the present year represent an expenditure of $11,935,945, the aggregate value of 6,021 permits. Since January 1st, the city has added to her honors as a home-building center, by constructing 1,182 dwellings at a cost of $3,523,620. In addition, thirty-five apartment buildings have been erected at a cost of $2,358,000, and eight flats at a cost of $57,000.

The month of July showed $1,559,205 in building permits issued, a half million in excess of the corresponding month of 1920. This figure includes the construction of 172 homes. Residence construction has been very active during the entire year to date, and prospects are bright for a continuance of home-building during the remainder of the summer and well into the fall.

Norton & Spangler, of Seattle, on their bid of $9,840, were awarded the contract for plumbing in the new $200,000 Capitol National Bank Building in Olympia. The contract for the heating, which approximated $5,000, was awarded to the Bergh-Griggs Company, of Tacoma.

The awarding of sub-contracts for the Stuart Building Addition at Fourth Avenue and University Street, Seattle, to cost $400,000, found Ashwell & Twist, the winners of the plumbing and heating contract on their bid of $10,793.

LOCAL CONTRACTORS HANDLE RURAL SCHOOL JOBS.

Reports from various parts of the state of Washington indicate a healthy condition in the building industry. During the summer, there has been an unusually large number of schools constructed, and this work, according to present indications, will continue until late in the fall. Plumbing and heating contractors in the larger cities have profited from the rural school construction, as in most cases the plans have been prepared by city architects, who give local plumbing and heating firms an opportunity to bid on the sub-contracts. A number of good-sized hotels have also been built, and the residence construction work has been active ever since the first of the year. The railroad strike has hampered the construction work in the inland cities.

Group in Front of the Convention Hall at Reno, Nevada.—From "Domestic Engineering" Photo, taken at Nevada Master Plumbers' Recent Convention.

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Open or close with seven-eighths turn. All standard patterns.

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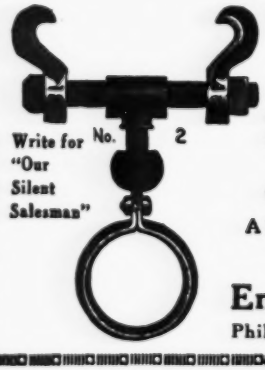

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Swings in any direction.

A big time and labor saver.

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EXPLAINS PLUMBERS' PROBLEMS TO OTHER BRANCHES OF BUILDING TRADES.

A. C. Sandberg, a Sanitary Engineer of Lafayette, Ind., Discusses Master Plumbers' Qualifications, and Also Some of Their Problems Which Have Led to Popular Misconceptions.

For the purpose of doing his part in giving the public a correct idea of the plumber's work and some of the difficulties he encounters, A. C. Sandberg, a sanitary engineer of Lafayette, Ind., has written the following article which appeared in the current number of "The Michigan Contractor and Builder":

"In many ways, the business of the plumbing and heating contractor, or sanitary engineer, is very different from others. The man who hopes to succeed today in this line must be well informed upon the subject of general business administration, but he must also be a qualified expert in the mechanical art upon which his business is based. The usual sanitary engineer or plumbing and heating contractor must, therefore, devote more time and study to complete his personal business equipment than the great majority of other business men today. In order to run his business effectively he must be a truly qualified workman and business man also. One may think, 'Oh, no,' the general contractor is far more important and the architect is more important than the plumber, and so on. But an architect can plan an enormous and magnificent building; the electrician can place all of the modern electrical appliances therein. Then look it over. Is it complete? Is it a structure which will be able to secure tenants? No! Just tell prospective tenants that there is no plumbing and heating equipment within the building, and there is nothing doing.

"It is quite natural for every man to think that his business is very essential to the community. The plumbing and heating business is more essential than most of the others. The plumbing and heating business requires investment of a considerable amount of capital. It requires lots of hard work and lots of hard thinking. Yet the plumber is often thought a robber, and the other fellow is a business man in the public view. Why is this? It is probable that this unfavorable idea of the sanitary engineer, or plumbing and heating contractor largely arises out of the fact that a very large part of his work for the community consists of the supply of labor as well as material. The public will be well enough informed of the fact that the wage rate for journeymen plumbers is $1 per hour. The average member of the public will also be equally well aware that the master plumber charges, say, $1.50 per hour for the resale to his customer, of the service of this labor. But the public is not so well informed about the cost of securing, handling and supplying this labor, which comes between buying it and reselling it to the customer. The customer who is thus charged $1.50 an hour for labor, which he believes costs only $1 per hour, immediately assumes that he is being robbed of 50 cents on every hour of this labor.

"Here are the facts in the case. In order to be able to supply such labor service on demand the sanitary engineer or plumbing and heating contractor must maintain an organization. The cost of maintaining such an organization produces a legitimate overhead charge which must be carried and paid by the business. According to figures verified by the National Trade Extension Bureau of the National Association of Master Plumbers, during the year 1920, the average rate of overhead for a plumbing and heating shop that did a volume of $50,000 worth of business in that year was in excess of 40 per cent of the cost of labor and material. Thus, during 1920, the plumbing and heating contractor who paid $1 per hour for his labor, and resold that labor to the customer for $1.50 an hour, was working on a margin of profit

so narrow that any one of a thousand contingencies could have wiped out the margin of profit, and converted it into an actual loss. As a matter of absolute truth, these contingencies almost invariably do occur, and the plumbing and heating contractor, more frequently than not, loses money on his labor service, except when a reasonable amount of profit-bearing material is sold along with the labor.

"Another favorite fairy tale that is believed to a considerable extent embodies the idea of the plumber always going back to the shop for tools, etc. In connection with this idea, it is more often, than not, the fault of the customer rather than the plumber, when the workman reaches the job and has to go back to the shop for either material or tools.

"Here is a sample case in point. A householder will call up the plumbing and heating shop by telephone. The order will be, 'Send a man out to fix our closet.' As there are a score of things about a water closet that might need attention, the clerk in the office of the plumbing and heating shop will then make a real effort to find out from the householder just what the trouble is. Then, usually arises a situation in which the householder develops an active grouch because the clerk is not a mind reader or a clairvoyant, in addition to all the other abilities that have to be possessed to hold a job. About as much as is usually learned is made plain by this. The householder finally will grudgingly state, 'I don't know why you expect me to know what's the matter. All I can tell you is that the closet won't flush.' Thus the clerk in the plumbing and heating shop is compelled to exercise his ability as a good guesser as to what may be the matter. The clerk guesses that the waste of the closet is stopped, makes out an order on that basis, and the journeyman proceeds to the job with the tools and equipment that will be necessary to clear the waste. When the journeyman gets on the job, he finds that instead of the waste being clogged up, that the closet will not flush because the flush valve in the tank of the closet is leaking and, consequently, the tank cannot collect water enough to properly flush the closet. The tools and equipment that he has brought with him for clearing a clogged waste pipe are useless, and he has to return to the shop for the necessary material and tools to properly take care of the work. Again, some housewife will telephone to the plumbing and heating shop and ask them to please come and fix the pipe on her kitchen range boiler. An effort on the part of the clerk to secure necessary information finally results in the housewife (after getting peeved) saying, 'I don't know what is the matter; all I know is that the pipes leak.' Here again the journeyman proceeds to the job on an absolute guess, which, of course, is based on what most frequently does happen. Many times in such cases he arrives on the job without either the proper tools

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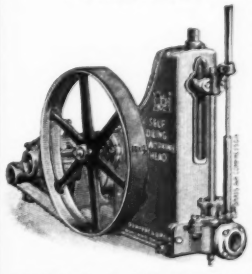

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Their construction, a Myers patented idea, solves many pumping problems and does away with former pump troubles. Covered working parts, a positive oiling system, enlarged valves, new method of power application and other features produce a standard of service different from others.

No prospective purchaser of a power pump should decide on another pump until he has thoroughly investigated the MYERS. Comparisons invited.

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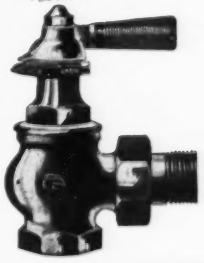
Perfect Vapor-Vacuum-Pressure HEATING SYSTEM



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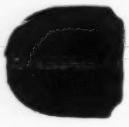

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or proper equipment. The question naturally arises why they don't make it a practice always to send with their journeyman all of the equipment in the way of material and tools that could be used on repair calls. The answer to that is that the stock of material in the way of pipe fittings alone, in the case of the average plumbing shop, represents something in the neighborhood of 300 separate items, in various sizes and styles, and pipe fittings are only one of the hundred things that might be required on the job of repairs. In the matter of tools that might be required on a job of repairs, there is an equal or greater number of things that could be used that might be needed. As very few sanitary engineers or journeymen plumbers have the carrying capacity of a ton truck, it is obvious that they are at a disadvantage when it comes to transporting along with themselves all of the material and tools that might be needed.

"The fact of the matter is that people have for so long a time been accustomed to the idea of blaming the plumber, and have found that so much easier to do, that they have not taken the trouble to learn those things about the plumbing of their dwellings that they really ought to know. If people at large would take this view of it, and take a little trouble to get posted on these things in the first place, they would find their plumbing and heating contractor eagerly willing to help them to the necessary knowledge without making any charge for this service whatever; and they would find themselves in the comfortable position of being certain that they could order plumbing and heating repairs intelligently, with the least possible expense for the service. It is a matter of absolute fact that the usual plumbing and heating contractor or sanitary engineer loses money on his repair business as a general rule. The only exceptions which occur to this rule are cases in which a fairly considerable amount of material is used on the job, and sold at a fair profit."

LEGAL QUESTIONNAIRE.

(Continued from Page 329.)

the parties cannot have any remedy in the courts of that state for a breach of such a contract.

I mentioned above the fact that the law of the place where real estate is located controls agreement made with respect to realty. By that is not meant such contracts as you have made with your customer, but refers to deeds, mortgages, agreements for sale of land which have to do with the alienation and transfer of real estate.

In addition to the above general rules, there is another even more general rule to the effect that in the absence of a claim to the contrary, the court where the case is heard will apply the law of that court. In other words, unless the court is asked to find that the law of the contract is the law of a state other than the one in which the case is being tried, and unless the law of this other state is put in evidence, the court will decide the case under the law of its own state.

Your question is one which at first thought might be considered of little importance, but in cases of building contractors who are doing more and more in states other than their own, it is of vital importance to know what construction will be placed on certain contracts. This phase of the situation may not be given serious consideration by the parties at the time of the contract, but when a dispute arises, and litigation results, it is a fact that most people will rely upon every loophole that turns up.

Whether your customer has a right to take the stand which he has taken, depends upon all the facts and the wording of your agreement, but it would seem that his claim is not without some basis for an argument.

Chas. Grunau, of Kansas City, Mo., has purchased the interest of his partner, Walter Bisang, in the plumbing business of Bisang & Grunau, and will in future have entire charge of the business.

PUMPS.

(Continued from Page 324.)

long as the speed remains constant. The power curve of a pump without the non-overload characteristic would show a sharp rise from, say, 2,000 to 2,400 gallons p. m.

The power curve reaches its highest point almost coincident with the peak of the efficiency curve. This means that motor and pump can operate each at its best efficiency, and that in case of a broken discharge pipe or other extreme reduction of head, the motor cannot be damaged by consequent overload.

To illustrate: Suppose the pump was installed to deliver 1,800 gallons p. m. at 95 ft., at which point it would show its best efficiency, there would be 59 B. h. p. required. The maximum h. p. the pump could consume would be 61. Therefore, a 60 h. p. motor is sufficiently large to drive the pump, and, furthermore, will run at practically full load, so that maximum electrical efficiency is secured as well as the highest overall efficiency of pump and motor. The greatest possible overload would be about 1½ per cent, which is negligible.

The term "Non-overload" is entirely relative, and should not be taken too broadly. The percentage of overload is usually calculated with reference to the full rated capacity of the driving motor. In this case, using a 60 h. p. motor, there can be no overload worthy of mention. Overload is also referred to the normal power required at the point of most efficient capacity for the pump in question, in this case 1,800 gallons p. m. At this point, however, 59 h. p. is required, or practically 60, and 60 h. p. is the nearest size commercial motor.

Consider the pump sold for 1,200 gallons p. m. capacity. 51 h. p. is required. If the power curve did not rise above 55, a 50 h. p. motor would be large enough for the pump. A 60 h. p. motor, however, should be installed as a 50 h. p. motor would be subjected to 22 per cent overload if the head was reduced.

Thus, it is evident that the pump has the non-overload power characteristic for capacities from 1,400 to 2,200 gallons p. m., which is really the range for which the pump is designed.

It is further evident that if the pump is to be used for lower capacities, a motor larger than the required horsepower would indicate, will be necessary, owing to heavy relative overloads encountered at reduced heads.

Suppose, for argument, that the pump was to supply 600 gallons p. m., 40 h. p. is required. The possible overload referred to 40, is 21 h. p. or 53 per cent, which would probably burn out the motor.

Therefore, for low capacities, the pump has an overloading power curve, which must be taken into account. Furthermore, it is impossible to design an 8-inch pump for capacities less than, say, 1,200 gallons p. m., and the head indicated on Fig. 5 will show a non-overload power curve.

As a general proposition, a pump should never be sold for capacities that are materially less than that capacity at which maximum efficiency occurs—in this case 1,800 gallons p. m.

In summing up, we see the Power curve, taken in conjunction with the Head and Efficiency curves, gives a complete graphic record of performance of the pump under nearly all conditions, if one of the four items, viz: Head, capacity, efficiency, and power, is known, the other three can be determined directly from the characteristics without further calculation.

(To be Continued.)

J. V. Stiefvater, of 836 Baronne Street, New Orleans, La., has sold his plumbing and heating business to two of his former employes, E. J. Eble and Edward Fischer, who will continue the business under the name of the Peerless Plumbing & Heating Co., Inc.

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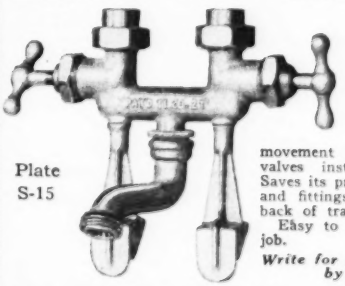

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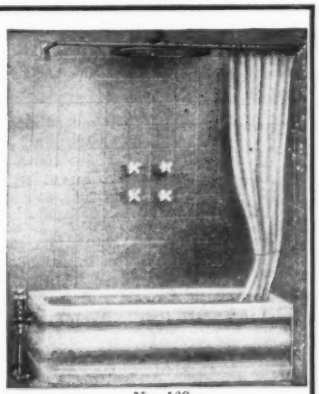

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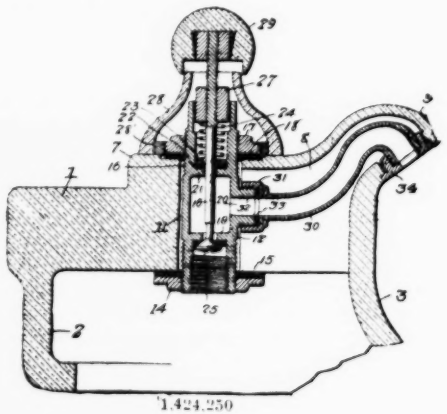
Patents

Plumbing Department.

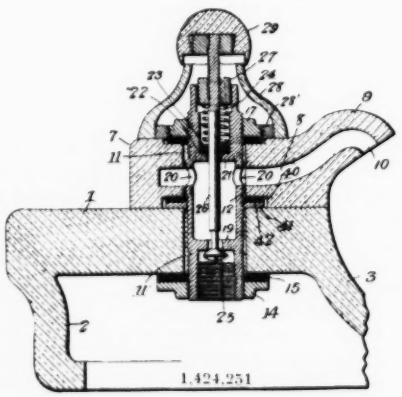
1,424,250. Lavatory. John F. Kelly, Trenton, N. J., assignor to Thomas Maddock's Sons Co., Trenton, N. J. A drinking water supply for lavatories comprising a chamber within the slab including a spout-like extension having an outlet opening overhanging the bowl, a valve mounted in the



1,424,250

chamber, and a discharge pipe connected to the valve casing extending through the chamber and extension and attached at its outer end within said outlet opening.

1,424,251. Faucet Attachment for Lavatories. John F. Kelly, Trenton, N. J., assignor to Thomas Maddock's Sons Co., Trenton, N. J. An article of manufacture comprising



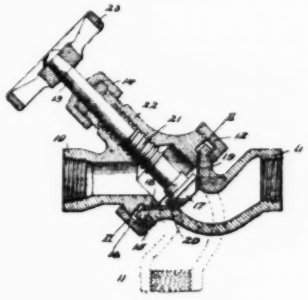
1,424,251

a block of earthenware having substantially flat, parallel top and bottom faces, an arcuate extension at one end above the plane of the top, a passageway through the block and said arcuate extension, the arcuate extension constituting a curved spout overhanging one end of the block, and a vertical opening to receive a valve casing.

Heating Department.

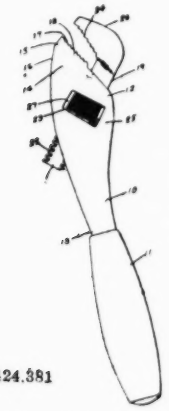
1,424,305. Combined Valve and Pipe Union. John Olof Hofberg, Philadelphia, Pa., assignor of one-half to Christian J. Steen, Philadelphia, Pa. A combined valve and pipe union, comprising two main members, one of said members providing a valve housing, the axis of said housing being set at an oblique angle to the main axis of the union, a valve spindle having suitable engagement in the housing for advancement

and retraction, a cone-shaped head on the spindle, the second member being provided with a socket and the first member with a projection both having the same taper as said head, a cone-shaped packing ring of the same taper as said head inserted in said socket and forming a seat both for said projection and said valve head, and means for drawing the two members together to form a tight joint.

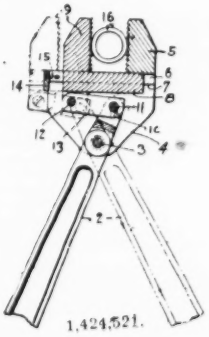


1,424,305.

1,424,381. Pipe Wrench. John Rudy, New Britain, Conn. In a pipe wrench, a fixed member having a handle shank, a body, and a jaw arranged in order along an axial line and with the tip of said jaw at one end of said line, a moving member having a jaw for co-operating with the jaw on the fixed member and a stem that is operatively supported by said body and is positioned diagonally across said line, and said members being constructed and arranged so that said axial line is substantially rectilinear and the pipe receiving opening that is defined by said jaws entirely on one side of said line, with the mouth or entrance portion adjacent said line.



1,424,381



1,424,521.

1,424,521. Wrench. Harley E. Rutter, Pittsburgh, Pa. In a wrench, the combination of a member carrying a stationary jaw and having a guideway, a movable jaw having an extension engaging said guideway, a handle pivotally connected to said member, a link pivotally connected to the upper end of said handle and to a lug formed at the outer lower end of said movable jaw, and a removable stop plate secured to said member for limiting the movement of said movable jaw away from said fixed jaw.

KANSAS MASTER PLUMBERS' ASSOCIATION SECURES MANY NEW MEMBERS.

J. A. Skelley, of Salina, Kansas, president of the Kansas Master Plumbers' Association, reports that since he was elected to that office in March, he has secured the services of W. R. Whitney, of Salina, as State Organizer, and that 115 new members have been added to the association's roll of membership.

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Situations Open

PLUMBER WANTED—STEADY POSITION to competent man. No strike. Open shop. Wages, $7.00 per day. Al Braunec, 117 S. 2nd St., La Crosse, Wis. 8-19

WANTED — EXPERIENCED MAN TO take charge of quotation department in established plumbing supply house. In reply state age, salary expected and reference. Address 612, "Domestic Engineering," 1900 Prairie Ave., Chicago. 8-19

WANTED

A Well-Known Manufacturer of Red Metal Brass Goods has an opening for a live wire salesman. Prefer a man who has sold the jobbing trade and knows how to work with jobbers' salesmen. To a man who can produce results, we offer a permanent connection in a good territory. Give full particulars in your first letter. Address 611, "Domestic Engineering," 1900 Prairie Ave., Chicago. 8-19-26

WANTED — COMPETENT PLUMBING and heating salesman. Must be able to take off heating and plumbing from plans. State experience, salary expected, in first letter. Southwest city of 35,000. Living conditions ideal. Address 608, "Domestic Engineering," 1900 Prairie Ave., Chicago. 8-12/9-16

WANTED—CAPABLE AND EXPERIenced man to take charge of plumbing and heating departments of an old established company in Michigan. Must be well qualified as an estimator, and capable of superintendence of all work and employes. Answer in own handwriting, giving qualifications and also salary expected. Address 609, "Domestic Engineering," 1900 Prairie Ave., Chicago. 8-12/9-2

SALESMAN WANTED—WITH WIDE experience and acquaintance among jobbers of plumbers goods; thorough knowledge of plumbing brass goods, woodwork, etc., necessary. Attractive opening with long established manufacturer available to right man. Only replies giving complete details of past experience and employers, lines handled, etc., considered. Address 598, "Domestic Engineering," 1900 Prairie Ave., Chicago, Ill. 7-29 tf

Miscellaneous

WANTED — BY SALES AGENT, plumbing and heating lines to sell to dealers on commission. Middle West territory. Address 610, "Domestic Engineering," 1900 Prairie Ave., Chicago. 8-19

PLUMBERS' STOP VALVE TAGS FOR marking stop cocks and valves in houses or large buildings. These tags printed with your name and address make an everlasting advertisement for your business. Send for samples and copy of chart "How to Tag Stop Cocks and Valves." Haddon Bin Label Co., Haddon Heights, N. J.

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SELL US YOUR SURPLUS PIPE COUPlings. Write us. The A. & J. Mfg. Co., 557 W. Lake St., Chicago. tf

Government Proposals

TREASURY DEPARTMENT, SUPERvising Architect's Office, Washington, D. C., August 10, 1922.—Sealed proposals will be opened in this office at 3 p. m., August 24, 1922, for the removal of two brick set boilers, etc., and the installation of one new portable horizontal return tubular fire box boiler, etc., at the United States Marine Hospital at Detroit, Michigan. Drawing and specification may be obtained from the Custodian, U. S. Marine Hospital, Detroit, Mich., or from this office in the discretion of the Supervising Architect. Jas. A. Wetmore, Acting Supervising Architect.

Books for Your Trade Library

BOOKKEEPING AND COST FINDING FOR THE PLUMBER. By Wesley A. Fink. Outlines a simple method of bookkeeping and cost finding easily adapted to your business. Tells how to open and close a set of books, gives concrete examples on figuring labor and material costs, overhead expense—in fact a complete system worked out in every detail. Size 4½x6¾ in. 128 pages. Cloth. Price, $1.00.

THE TABLE OF ESTIMATED RADIATION. By Harry B. Perrigo. Gives the accurate amount of radiation required for any size room. Computed from standard recognized rules and simplified to a degree that makes it readily understood by any man with even a limited knowledge of heating. Two tables—one for steam and the other for water—are printed in two colors on heavy celluloid—making four pages in all. Substantially bound. Size 4½x7¼ in. Saves time and eliminates errors. Price, postpaid $1.00.

MERCHANDISING THE PLUMBING BUSINESS. By Karl W. Zoeller. A treatise on merchandising as applied to the plumbing and heating business, that should be read by every plumber, contractor or jobbing plumber. The subject is completely covered by the twenty-six chapters, and in a manner making it interesting and easy to read. It contains many valuable suggestions on Window Display, Showrooms, Advertising, etc. No matter how large or small your business, you need this book. Size, 4½x 6¾ Inches. Over 100 pages. Price, postpaid, $1.50.

SIMPLEX ESTIMATE BOOK FOR MASTER PLUMBERS. This simplified system of making estimates was devised by a practical master plumber and used by him for many years. It has been compiled in book form containing 50 two-page estimates, printed on good bond paper suitable for pen or pencil. In addition to making the work of estimating extremely simple, accurate and quick, it keeps everything together, reminds you of every item and keeps a detailed record of all jobs. Size 8½x14 in., bound in heavy paper. Worth many times its cost. Price, postpaid only $1.00.

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